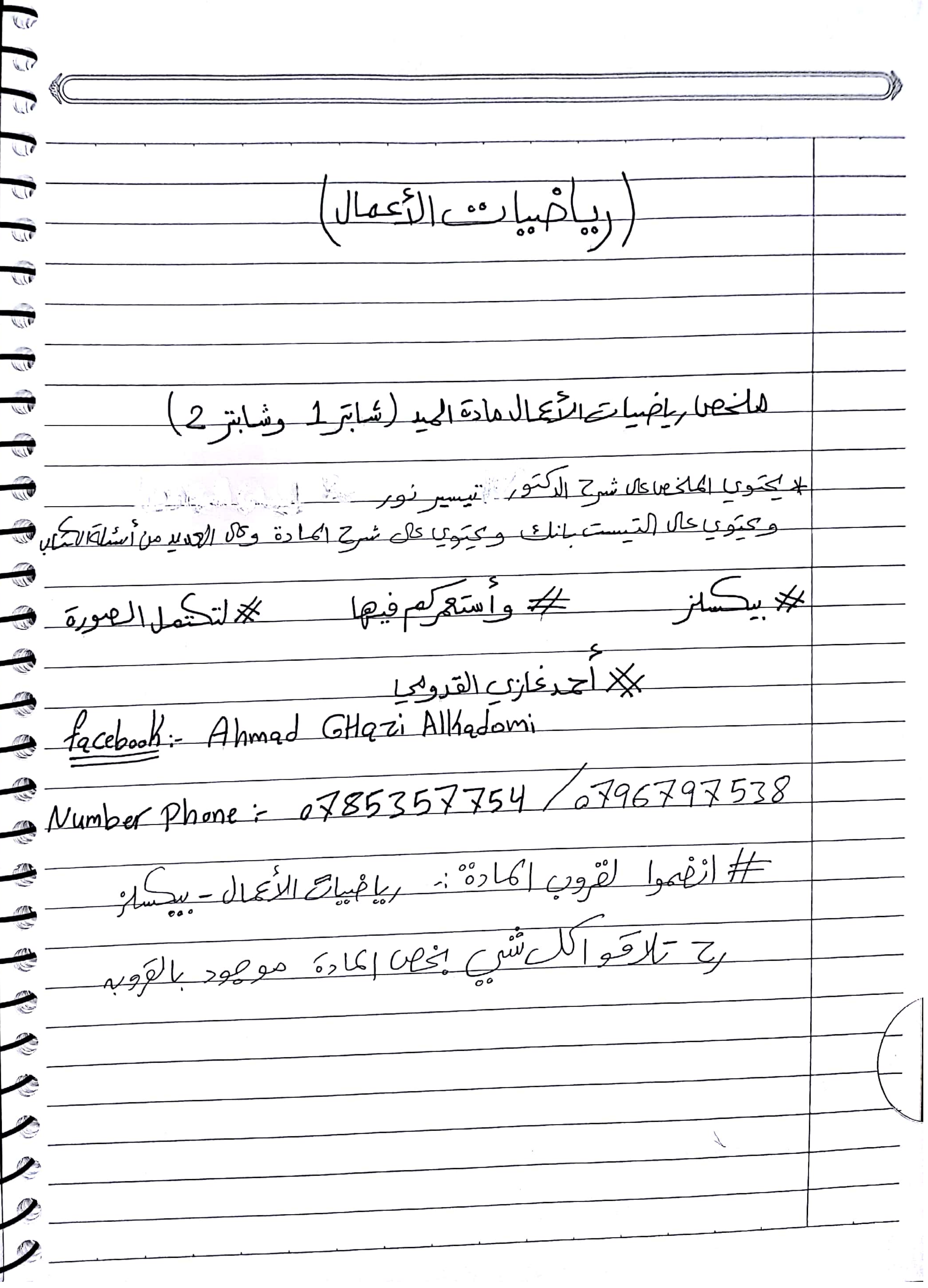


(رياضيات الأعمال)

ملخص رياضيات الأعمال مادة الميد (شابتر 1 وشابتر 2)

* يحتوي الملخص على شرح الدكتور تيسير نور
ويحتوي على التيست بانك ويحتوي على شرح المادة وعلى العديد من أسئلة الكتاب

بيكسلز # وأستعمركم فيها # لتكتمل الصورة

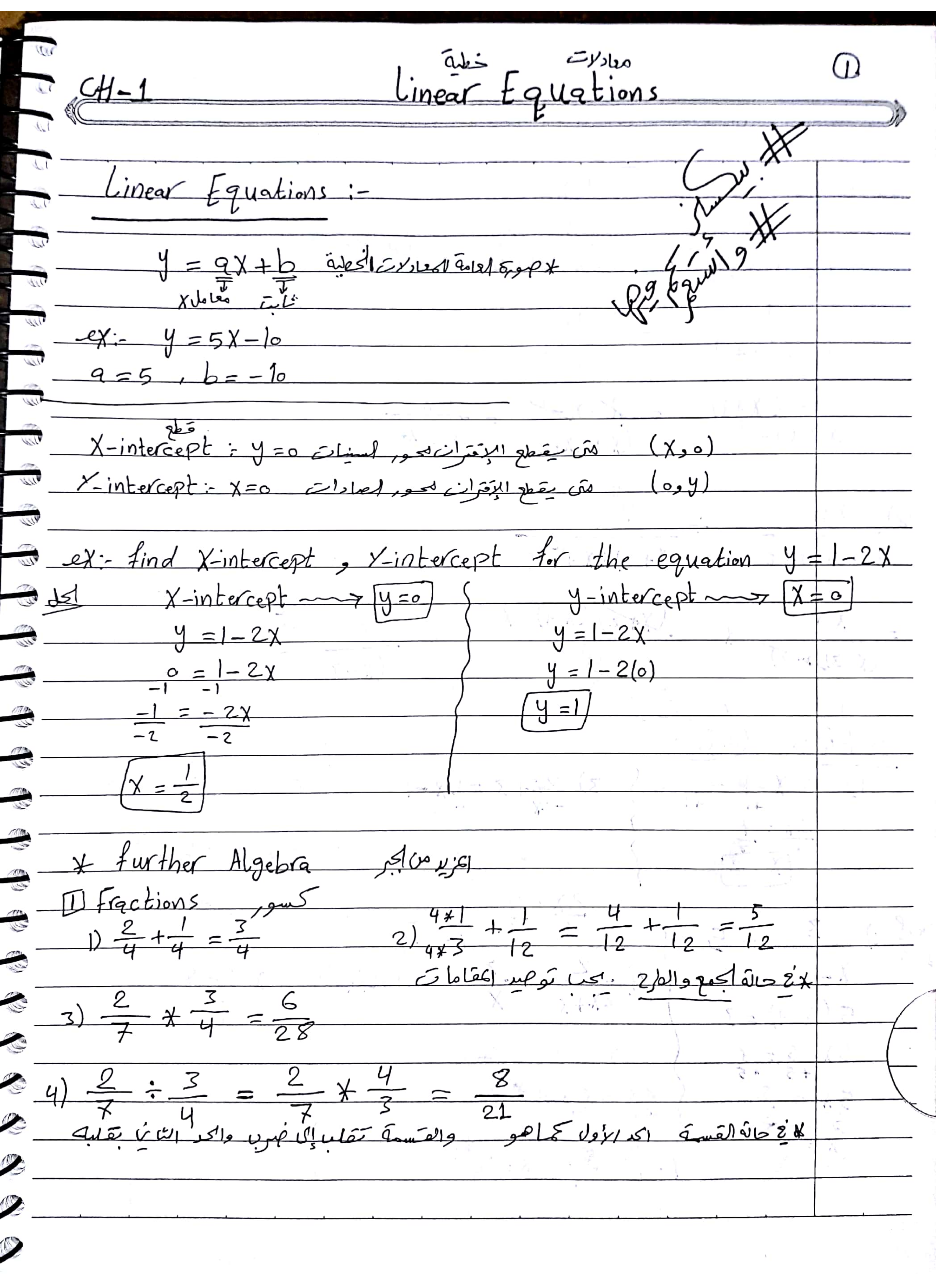
أحمد غازي القدومي

facebook:- Ahmad GHazi Alkadomi

Number Phone :- 0785357754 / 0796797538

انضموا لقروب المادة :- رياضيات الأعمال - بيكسلز

رح تلاقوا كل شي يخص المادة موجود بالقروب



Linear Equations

بسيطة
واستمتعوا

Linear Equations :-

$y = ax + b$ — الصورة العامة للمعادلات الخطية *

a: معامل x , b: ثابت

ex:- $y = 5x - 10$

$a = 5$, $b = -10$

---

x-intercept (قطع) : $y = 0$ — متى يقطع الإقتران محور السينات — $(x, 0)$

y-intercept :- $x = 0$ — متى يقطع الإقتران محور الصادات — $(0, y)$

ex:- find x-intercept , y-intercept for the equation $y = 1 - 2x$

الحل

x-intercept ⟶ $y = 0$

$y = 1 - 2x$

$0 = 1 - 2x$

$-1 \quad -1$

$\frac{-1}{-2} = \frac{-2x}{-2}$

$x = \frac{1}{2}$

y-intercept ⟶ $x = 0$

$y = 1 - 2x$

$y = 1 - 2(0)$

$y = 1$

---

* further Algebra — المزيد من الجبر

① Fractions — كسور

1) $\frac{2}{4} + \frac{1}{4} = \frac{3}{4}$

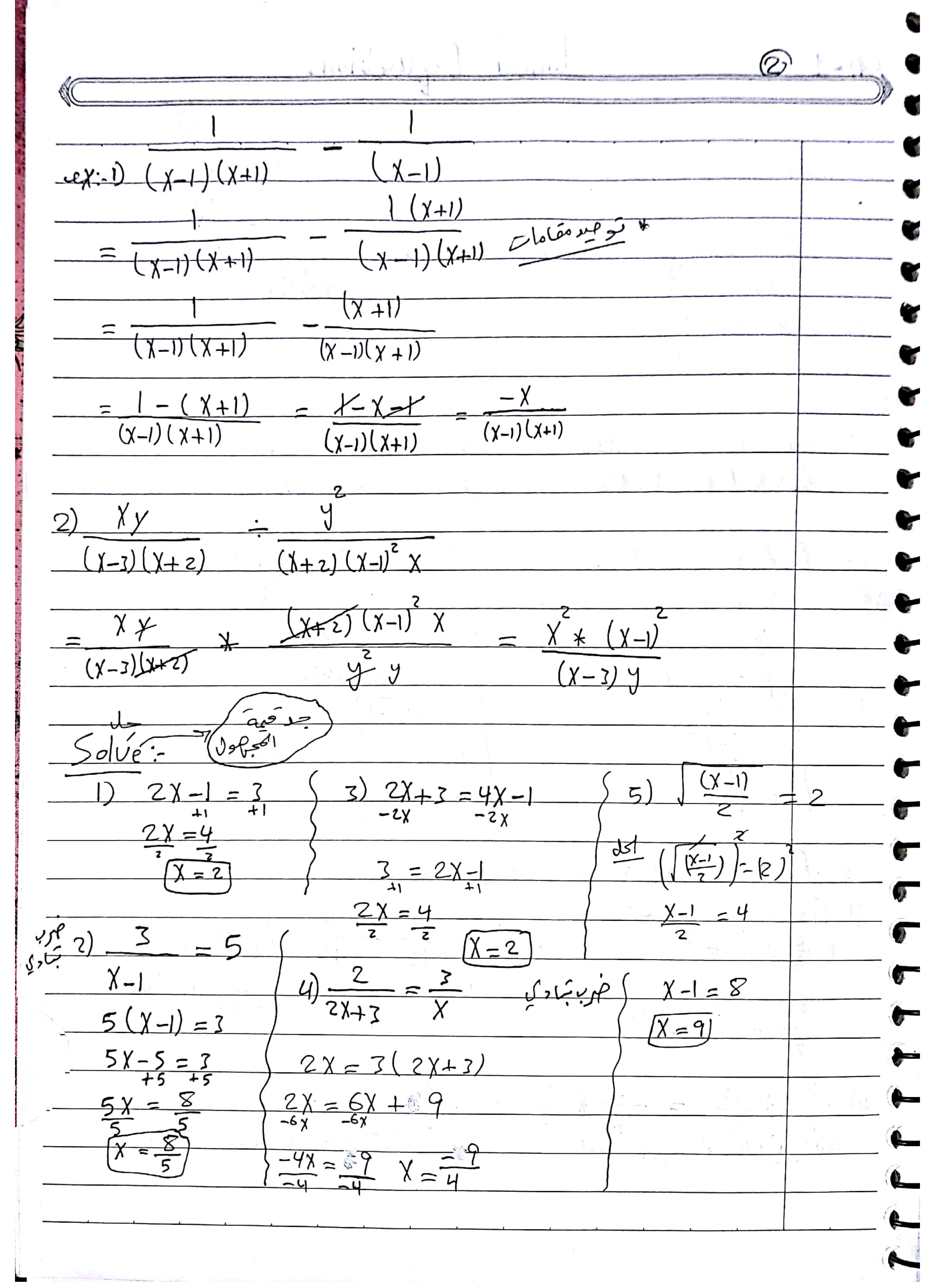
2) $\frac{1}{3} \rightarrow \frac{4*1}{4*3} + \frac{1}{12} = \frac{4}{12} + \frac{1}{12} = \frac{5}{12}$

* في حالة الجمع والطرح يجب توحيد المقامات

3) $\frac{2}{7} * \frac{3}{4} = \frac{6}{28}$

4) $\frac{2}{7} \div \frac{3}{4} = \frac{2}{7} * \frac{4}{3} = \frac{8}{21}$

* في حالة القسمة الحد الأول كما هو والقسمة تنقلب إلى ضرب والحد الثاني بنقلبه



ex:- 1) $\frac{1}{(x-1)(x+1)} - \frac{1}{(x-1)}$

$= \frac{1}{(x-1)(x+1)} - \frac{1(x+1)}{(x-1)(x+1)}$ * توحيد مقامات

$= \frac{1}{(x-1)(x+1)} - \frac{(x+1)}{(x-1)(x+1)}$

$= \frac{1-(x+1)}{(x-1)(x+1)} = \frac{1-x-1}{(x-1)(x+1)} = \frac{-x}{(x-1)(x+1)}$

2) $\frac{xy}{(x-3)(x+2)} \div \frac{y^2}{(x+2)(x-1)^2 x}$

$= \frac{xy}{(x-3)(x+2)} * \frac{(x+2)(x-1)^2 x}{y^2\, y} = \frac{x^2 * (x-1)^2}{(x-3)\, y}$

Solve :- حل → جد قيمة المجهول

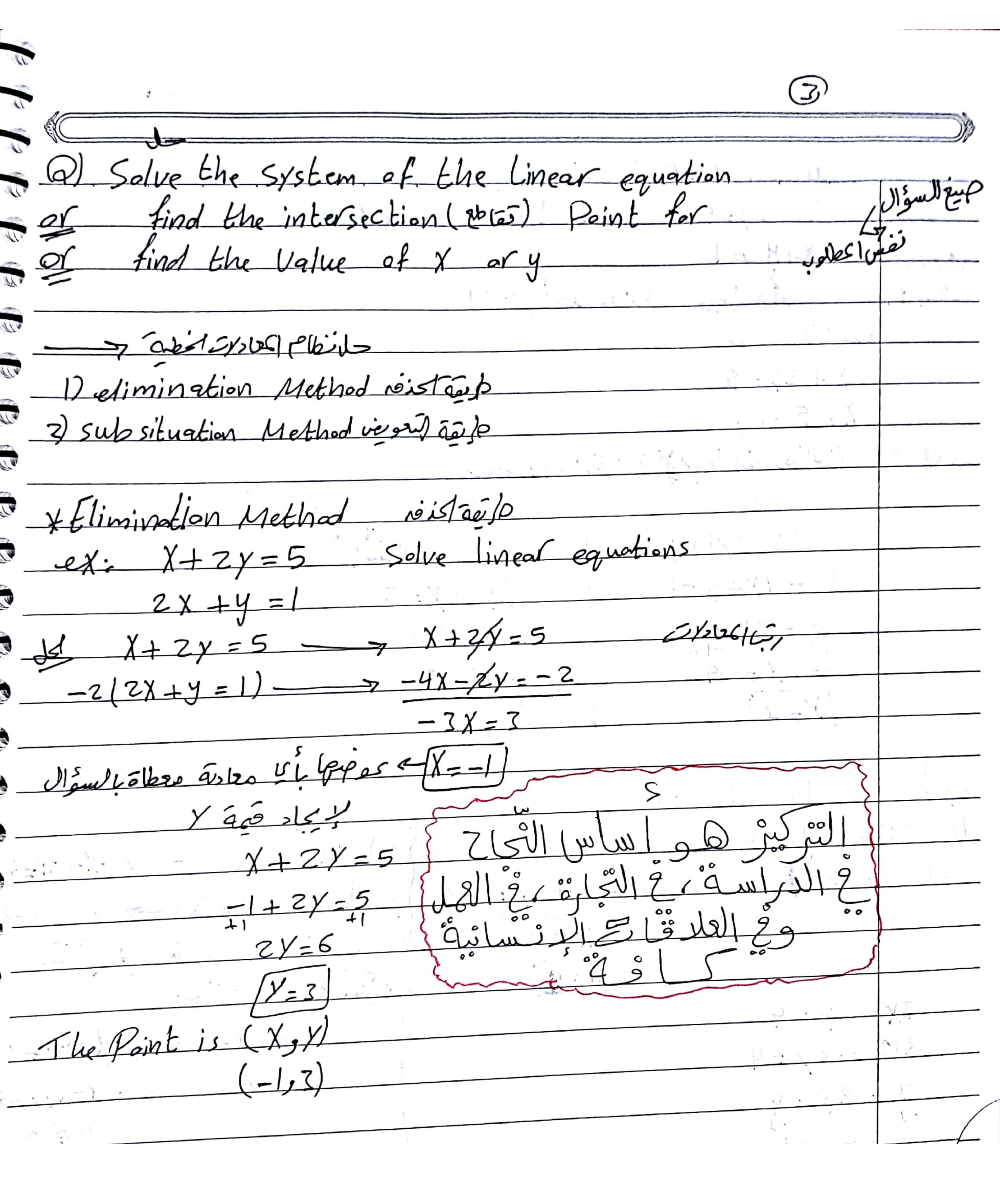
1) $2x - 1 = 3$
$\quad +1 \quad +1$
$\frac{2x}{2} = \frac{4}{2}$
$x = 2$

3) $2x + 3 = 4x - 1$
$\quad -2x \quad -2x$
$3 = 2x - 1$
$+1 \quad +1$
$\frac{2x}{2} = \frac{4}{2}$
$x = 2$

5) $\sqrt{\frac{(x-1)}{2}} = 2$
الحل $\left(\sqrt{\frac{(x-1)}{2}}\right)^2 = (2)^2$
$\frac{x-1}{2} = 4$
$x - 1 = 8$
$x = 9$

2) $\frac{3}{x-1} = 5$ ضرب تبادلي
$5(x-1) = 3$
$5x - 5 = 3$
$\quad +5 \quad +5$
$\frac{5x}{5} = \frac{8}{5}$
$x = \frac{8}{5}$

4) $\frac{2}{2x+3} = \frac{3}{x}$ ضرب تبادلي
$2x = 3(2x+3)$
$2x = 6x + 9$
$-6x \quad -6x$
$\frac{-4x}{-4} = \frac{-9}{-4} \quad x = \frac{-9}{4}$



حل

Q) Solve the system of the linear equation
or find the intersection (تقاطع) Point for
or find the Value of x or y

صيغ السؤال ← نفس المطلوب

حل نظام المعادلات الخطية ←

1) elimination Method طريقة الحذف
2) subsituation Method طريقة التعويض

* Elimination Method طريقة الحذف

ex: $x+2y=5$ Solve linear equations
$2x+y=1$

الحل

رتب المعادلات

$x+2y=5 \rightarrow x+2y=5$

$-2(2x+y=1) \rightarrow -4x-2y=-2$

$-3x=3$

$\boxed{x=-1}$ ← نعوضها بأي معادلة معطاة بالسؤال لإيجاد قيمة y

$x+2y=5$

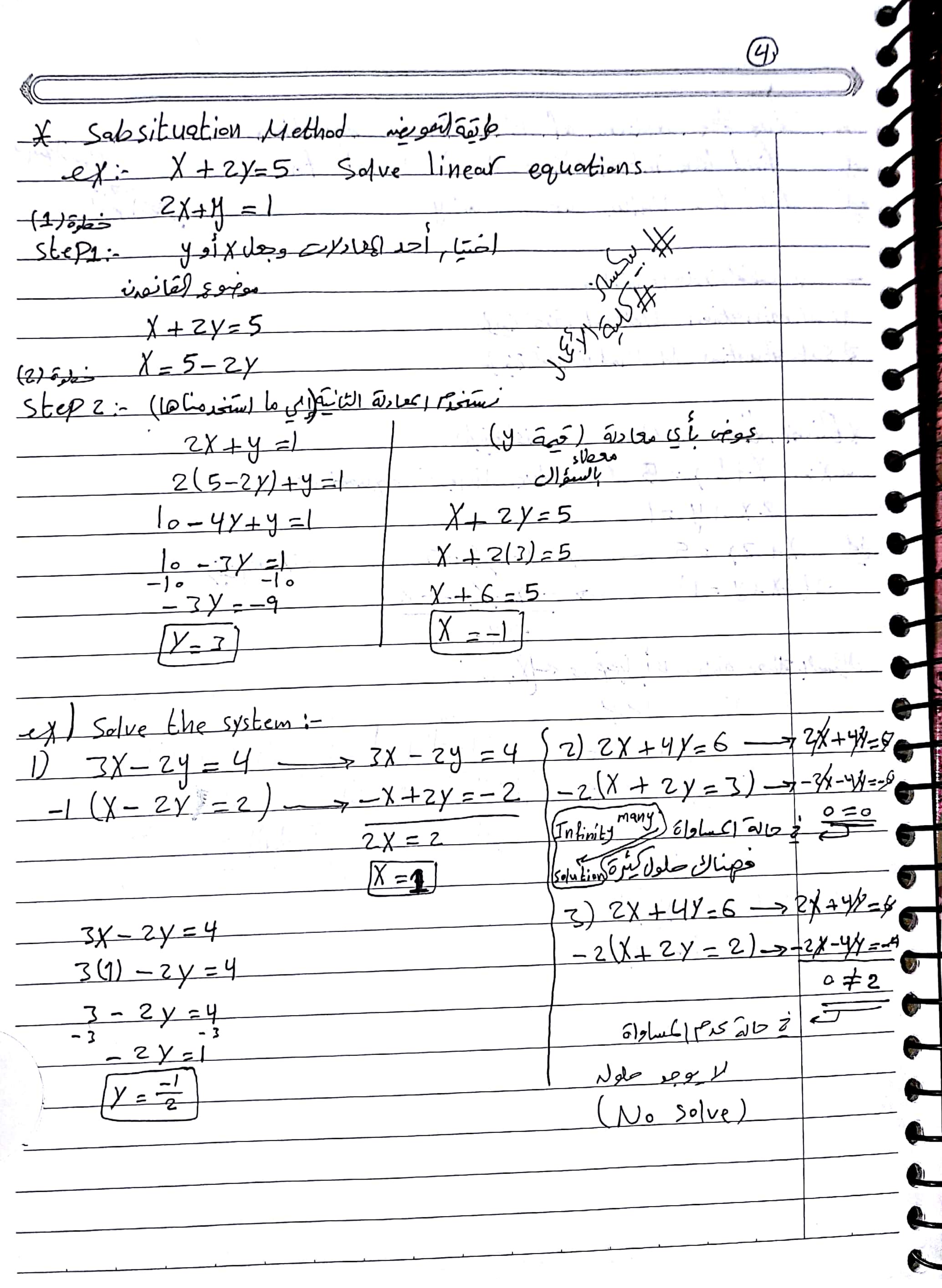
$-1+2y=5$ ($+1$, $+1$)

$2y=6$

$\boxed{y=3}$

The Point is (x,y)
$(-1,3)$

التركيز هو أساس النجاح في الدراسة، في التجارة، في العمل وفي العلاقات الإنسانية كافة



Sabsituation Method طريقة التعويض

ex:- $x + 2y = 5$ Solve linear equations

$2x + y = 1$

خطوة (1)
step1:- اختيار أحد المعادلات وجعل x أو y موضوع القانون

$x + 2y = 5$

$x = 5 - 2y$

خطوة (2)
step 2:- نستخدم المعادلة الثانية (إلي ما استخدمناها)

$2x + y = 1$

$2(5 - 2y) + y = 1$

$10 - 4y + y = 1$

$10 - 3y = 1$

$-10 \qquad -10$

$-3y = -9$

$\boxed{y = 3}$

نعوض بأي معادلة (قيمة y) معطاة بالسؤال

$x + 2y = 5$

$x + 2(3) = 5$

$x + 6 = 5$

$\boxed{x = -1}$

ex) Solve the system :-

1) $3x - 2y = 4 \longrightarrow 3x - 2y = 4$

$-1(x - 2y = 2) \longrightarrow -x + 2y = -2$

$2x = 2$

$\boxed{x = 1}$

$3x - 2y = 4$

$3(1) - 2y = 4$

$3 - 2y = 4$

$-3 \qquad -3$

$-2y = 1$

$\boxed{y = \frac{-1}{2}}$

2) $2x + 4y = 6 \longrightarrow 2x + 4y = 6$

$-2(x + 2y = 3) \longrightarrow -2x - 4y = -6$

$0 = 0$

في حالة المساواة فهناك حلول كثيرة (Infinity many solution)

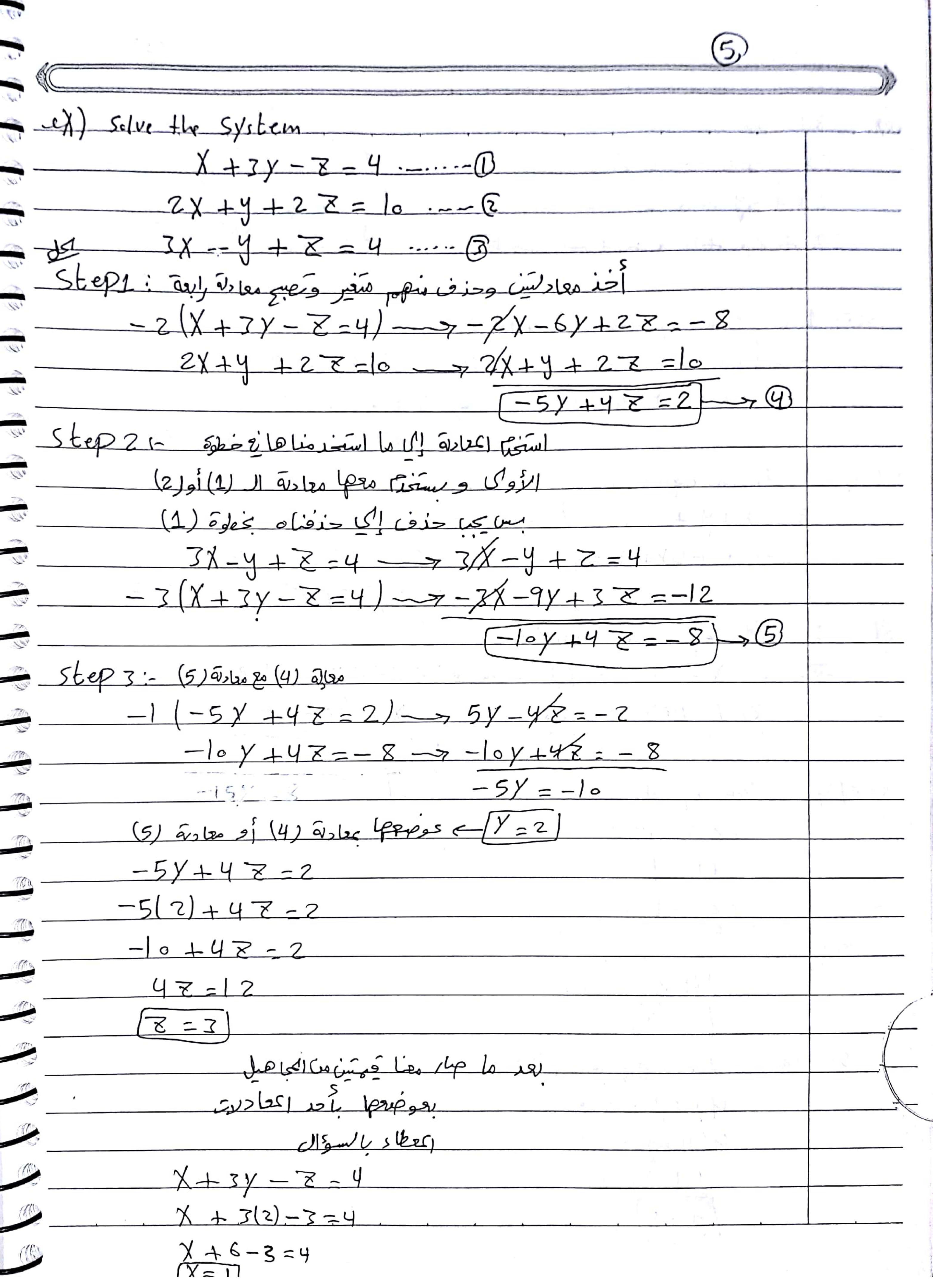
3) $2x + 4y = 6 \longrightarrow 2x + 4y = 6$

$-2(x + 2y = 2) \longrightarrow -2x - 4y = -4$

$0 \neq 2$

في حالة عدم المساواة لا يوجد حلول

(No solve)



c) Solve the system

$$x + 3y - z = 4 \quad \ldots\ldots (1)$$
$$2x + y + 2z = 10 \quad \ldots (2)$$
$$3x - y + z = 4 \quad \ldots\ldots (3)$$

الحل

Step1 : أخذ معادلتين وحذف منهم متغير وتصبح معادلة رابعة

$$-2(x + 3y - z = 4) \longrightarrow -2x - 6y + 2z = -8$$
$$2x + y + 2z = 10 \longrightarrow 2x + y + 2z = 10$$
$$\boxed{-5y + 4z = 2} \longrightarrow (4)$$

Step 2 :- استخدم المعادلة إلي ما استخدمناها في خطوة الأولى و بستخدم معها معادلة الـ (1) أو (2)

بس يجب حذف إلي حذفناه بخطوة (1)

$$3x - y + z = 4 \longrightarrow 3x - y + z = 4$$
$$-3(x + 3y - z = 4) \longrightarrow -3x - 9y + 3z = -12$$
$$\boxed{-10y + 4z = -8} \longrightarrow (5)$$

Step 3 :- معادلة (4) مع معادلة (5)

$$-1(-5y + 4z = 2) \longrightarrow 5y - 4z = -2$$
$$-10y + 4z = -8 \longrightarrow -10y + 4z = -8$$
$$-5y = -10$$

$\boxed{y = 2}$ ← عوضها بمعادلة (4) أو معادلة (5)

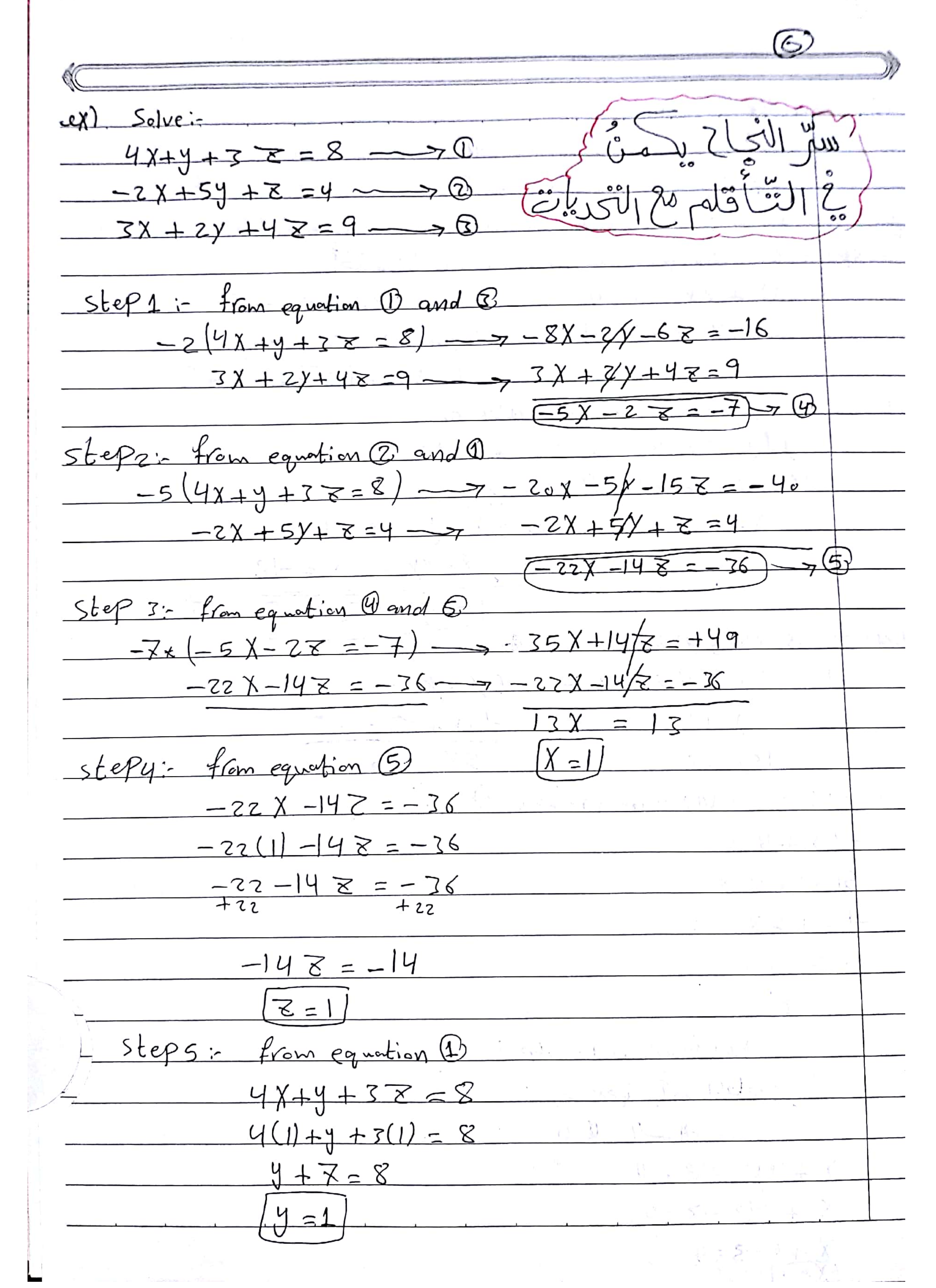
$$-5y + 4z = 2$$
$$-5(2) + 4z = 2$$
$$-10 + 4z = 2$$
$$4z = 12$$
$$\boxed{z = 3}$$

بعد ما صار معنا قيمتين من المجاهيل

بعوضهم بأحد المعادلات

المعطاه بالسؤال

$$x + 3y - z = 4$$
$$x + 3(2) - 3 = 4$$
$$x + 6 - 3 = 4$$
$$\boxed{x = 1}$$



ex) Solve:-

$4x+y+3z=8 \longrightarrow ①$

$-2x+5y+z=4 \longrightarrow ②$

$3x+2y+4z=9 \longrightarrow ③$

سرّ النجاح يكمن في التأقلم مع التحديات

step 1 :- from equation ① and ③

$-2(4x+y+3z=8) \longrightarrow -8x-2y-6z=-16$

$3x+2y+4z=9 \longrightarrow 3x+2y+4z=9$

$\boxed{-5x-2z=-7} \longrightarrow ④$

step 2 :- from equation ② and ①

$-5(4x+y+3z=8) \longrightarrow -20x-5y-15z=-40$

$-2x+5y+z=4 \longrightarrow -2x+5y+z=4$

$\boxed{-22x-14z=-36} \longrightarrow ⑤$

step 3 :- from equation ④ and ⑤

$-7*(-5x-2z=-7) \longrightarrow 35x+14z=+49$

$-22x-14z=-36 \longrightarrow -22x-14z=-36$

$13x=13$

$\boxed{x=1}$

step 4 :- from equation ⑤

$-22x-14z=-36$

$-22(1)-14z=-36$

$-22-14z=-36$

$+22 \qquad +22$

$-14z=-14$

$\boxed{z=1}$

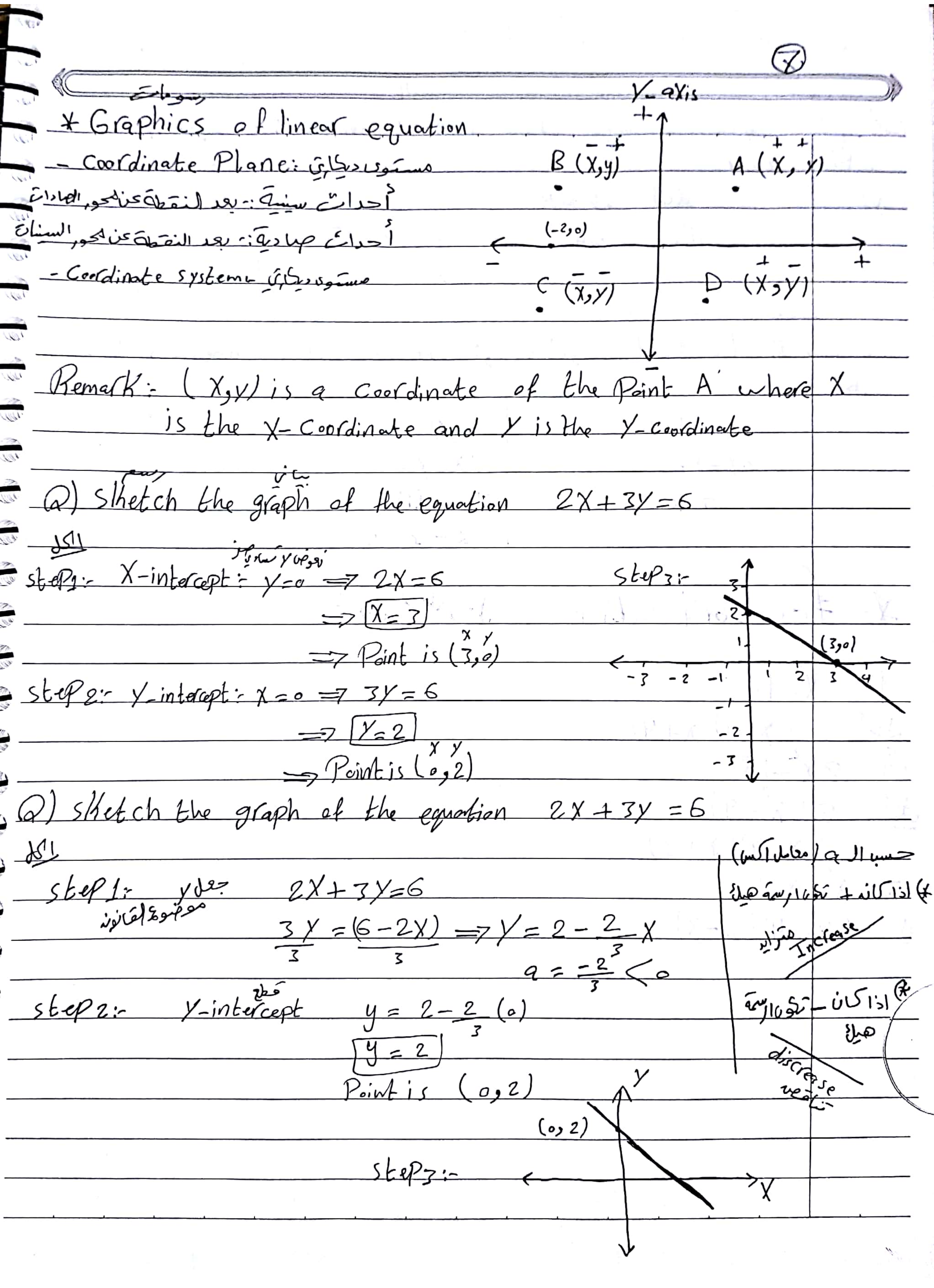
step 5 :- from equation ①

$4x+y+3z=8$

$4(1)+y+3(1)=8$

$y+7=8$

$\boxed{y=1}$



رسومات

* Graphics of linear equation

- Coordinate Plane: مستوى ديكارتي

أحداث سينية: بعد النقطة عن محور الصادات

أحداث صادية: بعد النقطة عن محور السينات

- Coordinate system: مستوى ديكارتي

Remark: (X, Y) is a coordinate of the Point A where X is the X-coordinate and Y is the Y-coordinate

Q) sketch (رسم) the graph (بيان) of the equation $2X + 3Y = 6$

الحل

step 1: X-intercept: $Y = 0$ (نعوض Y بصفر) $\Rightarrow 2X = 6$

$\Rightarrow \boxed{X = 3}$

$\Rightarrow$ Point is $(3, 0)$

step 2: Y-intercept: $X = 0 \Rightarrow 3Y = 6$

$\Rightarrow \boxed{Y = 2}$

$\Rightarrow$ Point is $(0, 2)$

step 3:

Q) sketch the graph of the equation $2X + 3Y = 6$

الحل

step 1: جعل Y موضوع القانون

$2X + 3Y = 6$

$\frac{3Y}{3} = \frac{(6 - 2X)}{3} \Rightarrow Y = 2 - \frac{2}{3}X$

$a = \frac{-2}{3} < 0$

step 2: Y-intercept (قطع)

$y = 2 - \frac{2}{3}(0)$

$\boxed{y = 2}$

Point is $(0, 2)$

step 3:

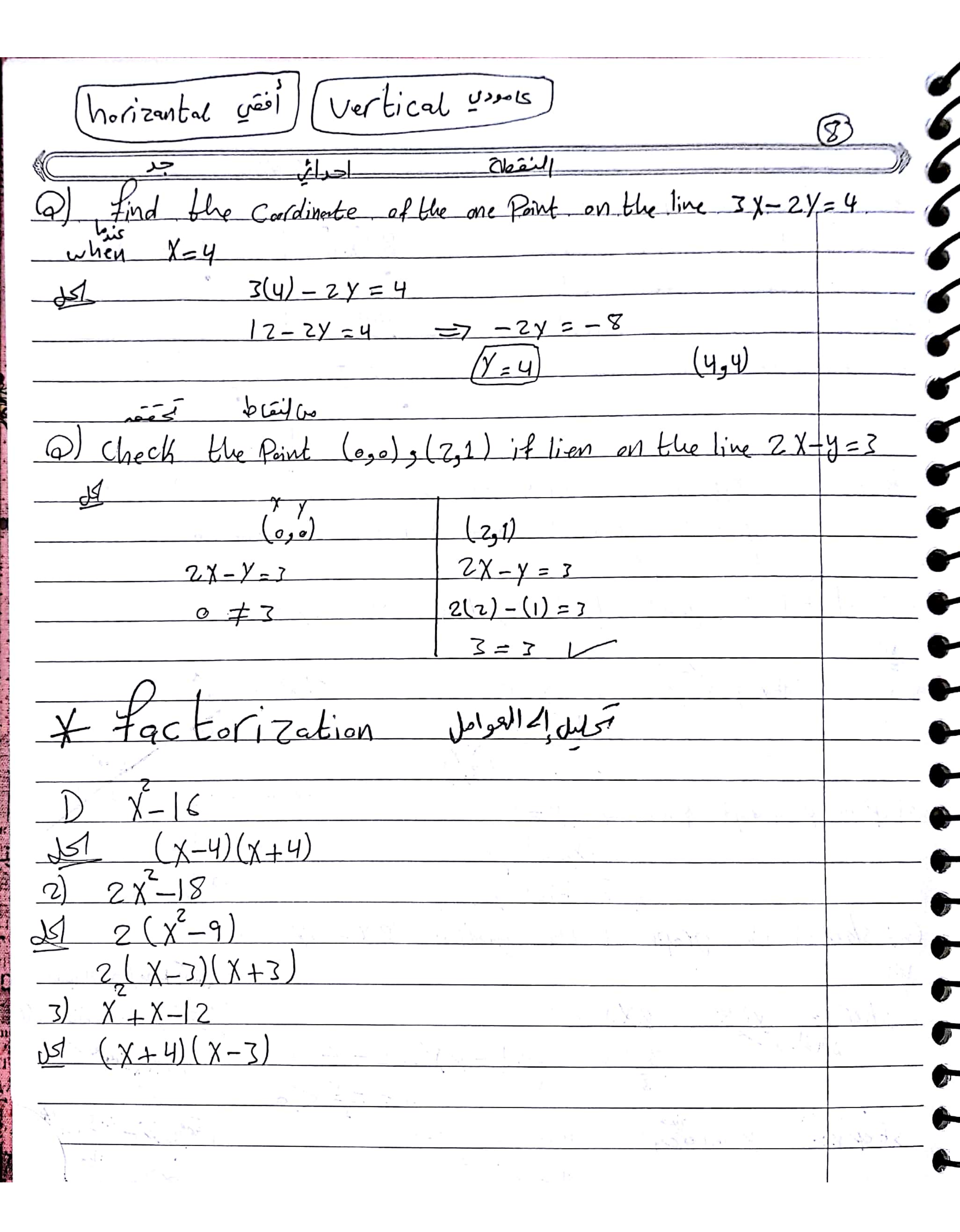
حسب الـ a (معامل اكس)

* اذا كانت + تكون الرسمة هيك

متزايد Increase

* اذا كان − تكون الرسمة هيك

discrease متناقص



horizontal أفقي | vertical عامودي

(8)

جد | احداثي | النقطة

Q) find the Cordinate of the one Point on the line $3x-2y=4$
عندما
when $x=4$

الحل
$3(4)-2y=4$

$12-2y=4 \Rightarrow -2y=-8$

$\boxed{y=4}$ $(4,4)$

تحقق | من النقاط

Q) Check the Point $(0,0)$, $(2,1)$ if lien on the line $2x-y=3$

الحل

$(0,0)$	$(2,1)$
$2x-y=3$	$2x-y=3$
$0 \neq 3$	$2(2)-(1)=3$
	$3=3$ ✓

* factorization تحليل العوامل

1) x^2-16

الحل $(x-4)(x+4)$

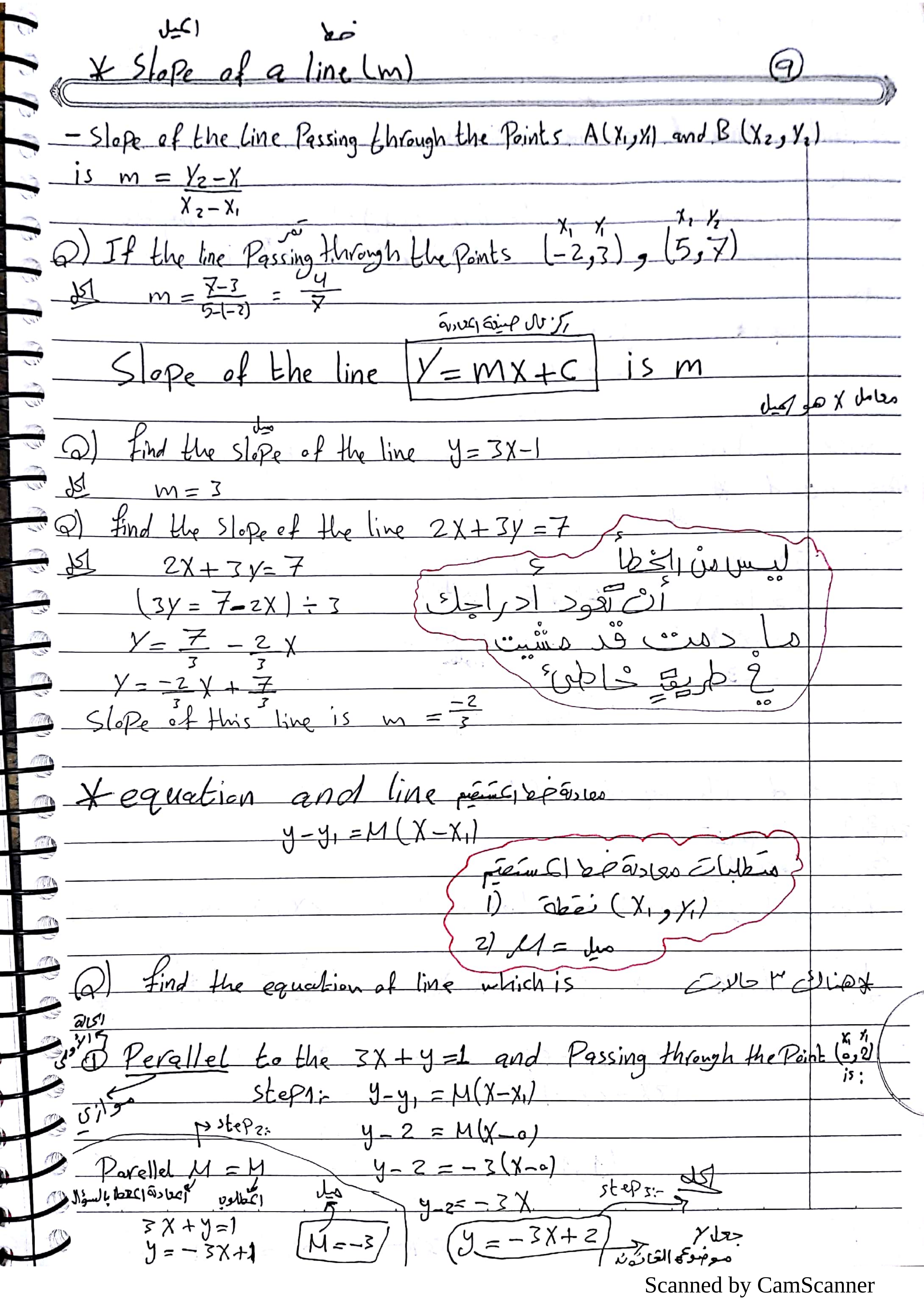
2) $2x^2-18$

الحل $2(x^2-9)$

$2(x-3)(x+3)$

3) x^2+x-12

الحل $(x+4)(x-3)$



الميل خط

* Slope of a line (m)

- Slope of the line passing through the points $A(x_1, y_1)$ and $B(x_2, y_2)$ is $m = \frac{y_2 - y_1}{x_2 - x_1}$

Q) If the line passing (تمر) through the points $(-2, 3)$, $(5, 7)$

الحل $m = \frac{7-3}{5-(-2)} = \frac{4}{7}$

ركز هاي صيغة معيارية

Slope of the line $y = mx + c$ is m

معامل X هو الميل

Q) Find the slope (ميل) of the line $y = 3x - 1$

الحل $m = 3$

Q) Find the slope of the line $2x + 3y = 7$

الحل $2x + 3y = 7$

$(3y = 7 - 2x) \div 3$

$y = \frac{7}{3} - \frac{2}{3}x$

$y = \frac{-2}{3}x + \frac{7}{3}$

Slope of this line is $m = \frac{-2}{3}$

ليس من الخطأ أن تعود أدراجك ما دمت قد مشيت في طريقٍ خاطئ

* Equation and line معادلة خط المستقيم

$y - y_1 = m(x - x_1)$

متطلبات معادلة خط المستقيم
1) نقطة (x_1, y_1)
2) $m =$ ميل

Q) Find the equation of line which is: * هناك ٣ حالات

الحالة الأولى ① Parallel (موازي) to the $3x + y = 1$ and passing through the point $(0, 2)$ is:

step1: $y - y_1 = m(x - x_1)$

step2: $y - 2 = m(x - 0)$

Parallel $m = m$

$y - 2 = -3(x - 0)$

المعادلة المعطاة بالسؤال — المطلوب

$3x + y = 1$

$y = -3x + 1$

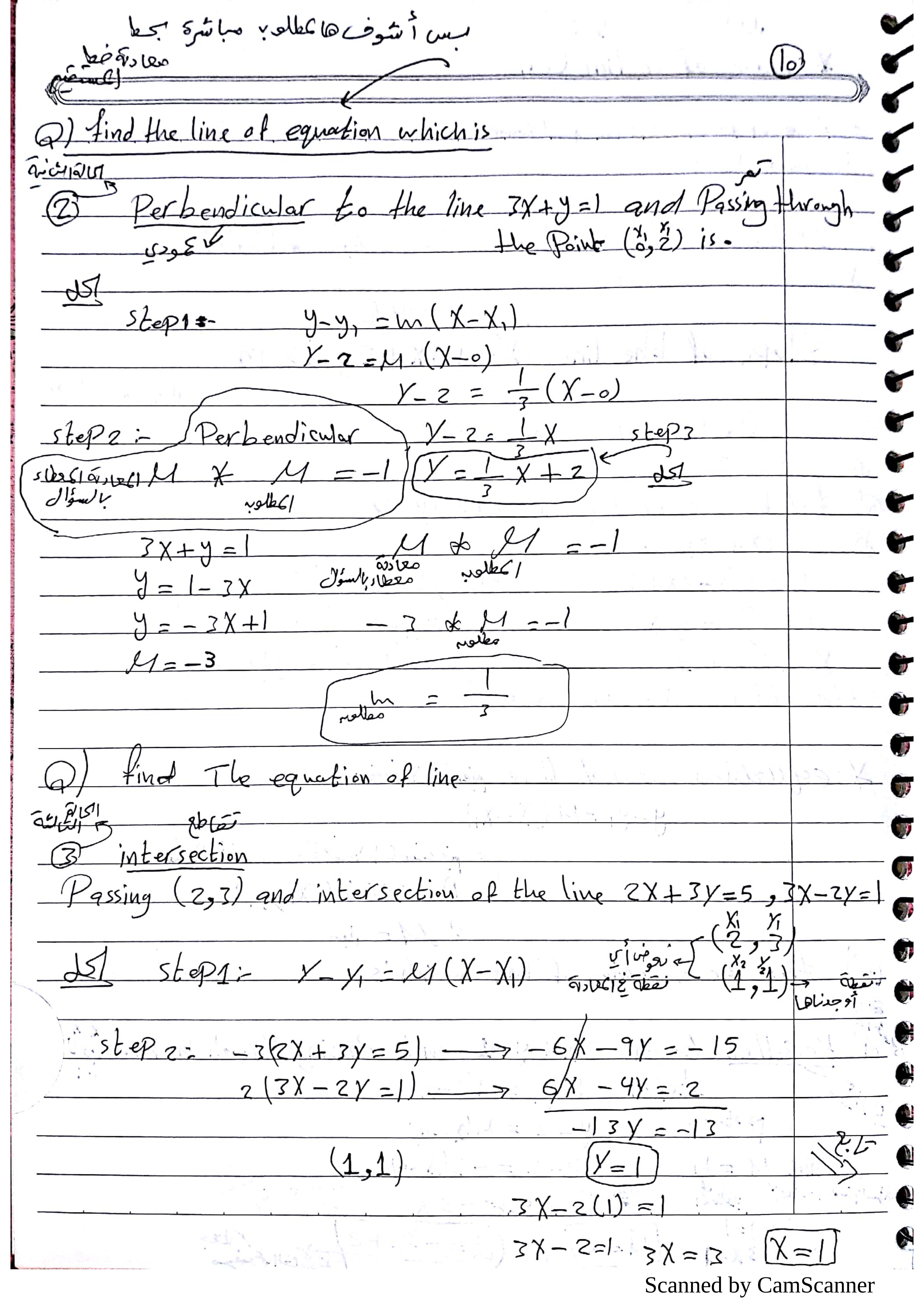
ميل $m = -3$

$y - 2 = -3x$

step3: الحل

$y = -3x + 2$

جعل y موضوع القانون



بس أشوف ها المطلوب مباشرة بحط معادلة خط المستقيم

Q) find the line of equation which is

الحالة الثانية

(2) Perbendicular (عمودي) to the line $3X+y=1$ and Passing through (تمر) the Point $(\overset{x_1}{0}, \overset{y_1}{2})$ is.

الحل

step1:- $y - y_1 = m(X - X_1)$

$Y - 2 = M(X - 0)$

$Y - 2 = \frac{1}{3}(X - 0)$

step2:- Perbendicular

$M_{\text{المعادلة المعطاة بالسؤال}} * M_{\text{المطلوب}} = -1$

$Y - 2 = \frac{1}{3}X$

step3 — الحل: $Y = \frac{1}{3}X + 2$

$3X + y = 1$

$y = 1 - 3X$

$y = -3X + 1$

$M = -3$

$M_{\text{معادلة معطاة بالسؤال}} * M_{\text{المطلوب}} = -1$

$-3 * M_{\text{مطلوب}} = -1$

$m_{\text{مطلوب}} = \frac{1}{3}$

Q) find The equation of line

الحالة الثالثة

(3) intersection (تقاطع)

Passing $(2,3)$ and intersection of the line $2X+3Y=5$, $3X-2Y=1$

الحل

step1:- $Y - Y_1 = M(X - X_1)$

نعوض أي نقطة في المعادلة: $(\overset{x_1}{2}, \overset{y_1}{3})$, $(\overset{x_2}{1}, \overset{y_2}{1})$ ← نقطة أوجدناها

step 2: $-3(2X + 3Y = 5) \longrightarrow -6X - 9Y = -15$

$2(3X - 2Y = 1) \longrightarrow 6X - 4Y = 2$

$-13Y = -13$

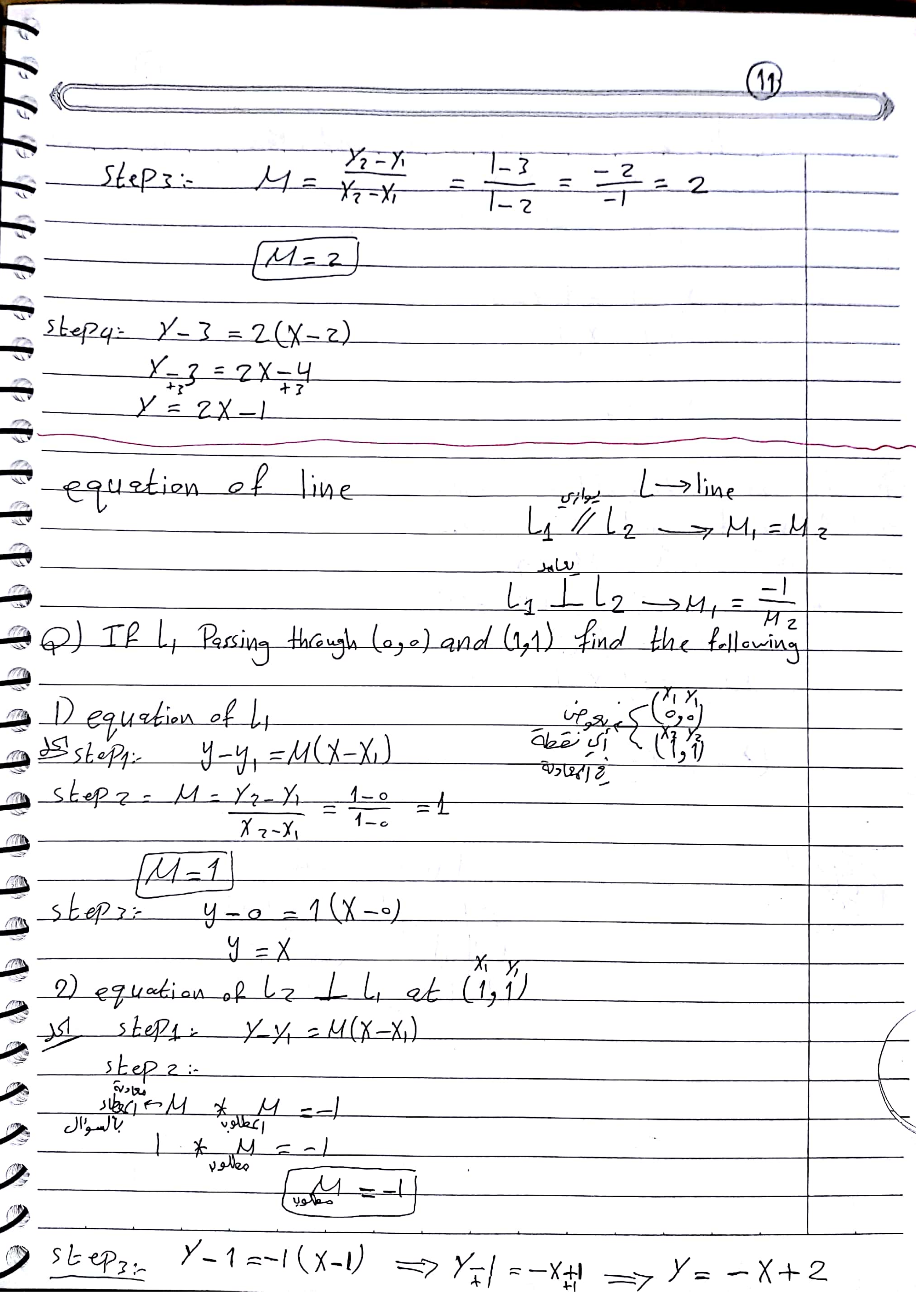
$Y = 1$

$(1,1)$

$3X - 2(1) = 1$

$3X - 2 = 1$, $3X = 3$, $X = 1$

تابع



Step3:- $M = \frac{Y_2 - Y_1}{X_2 - X_1} = \frac{1-3}{1-2} = \frac{-2}{-1} = 2$

$M = 2$

step4:- $Y - 3 = 2(X - 2)$

$Y - 3 = 2X - 4$ (+3, +3)

$Y = 2X - 1$

---

equation of line

$L \to$ line

يوازي

$L_1 // L_2 \to M_1 = M_2$

يعامد

$L_1 \perp L_2 \to M_1 = \frac{-1}{M_2}$

Q) If L_1 Passing through (0,0) and (1,1) find the following

1) equation of L_1

نعوض أي نقطة في المعادلة: $(X_1, Y_1) = (0,0)$ ، $(X_2, Y_2) = (1,1)$

اكتب step1:- $y - y_1 = M(X - X_1)$

step2:- $M = \frac{Y_2 - Y_1}{X_2 - X_1} = \frac{1-0}{1-0} = 1$

$M = 1$

step3:- $y - 0 = 1(X - 0)$

$y = X$

2) equation of $L_2 \perp L_1$ at $(1,1)$ (X_1, Y_1)

اكتب step1:- $Y - Y_1 = M(X - X_1)$

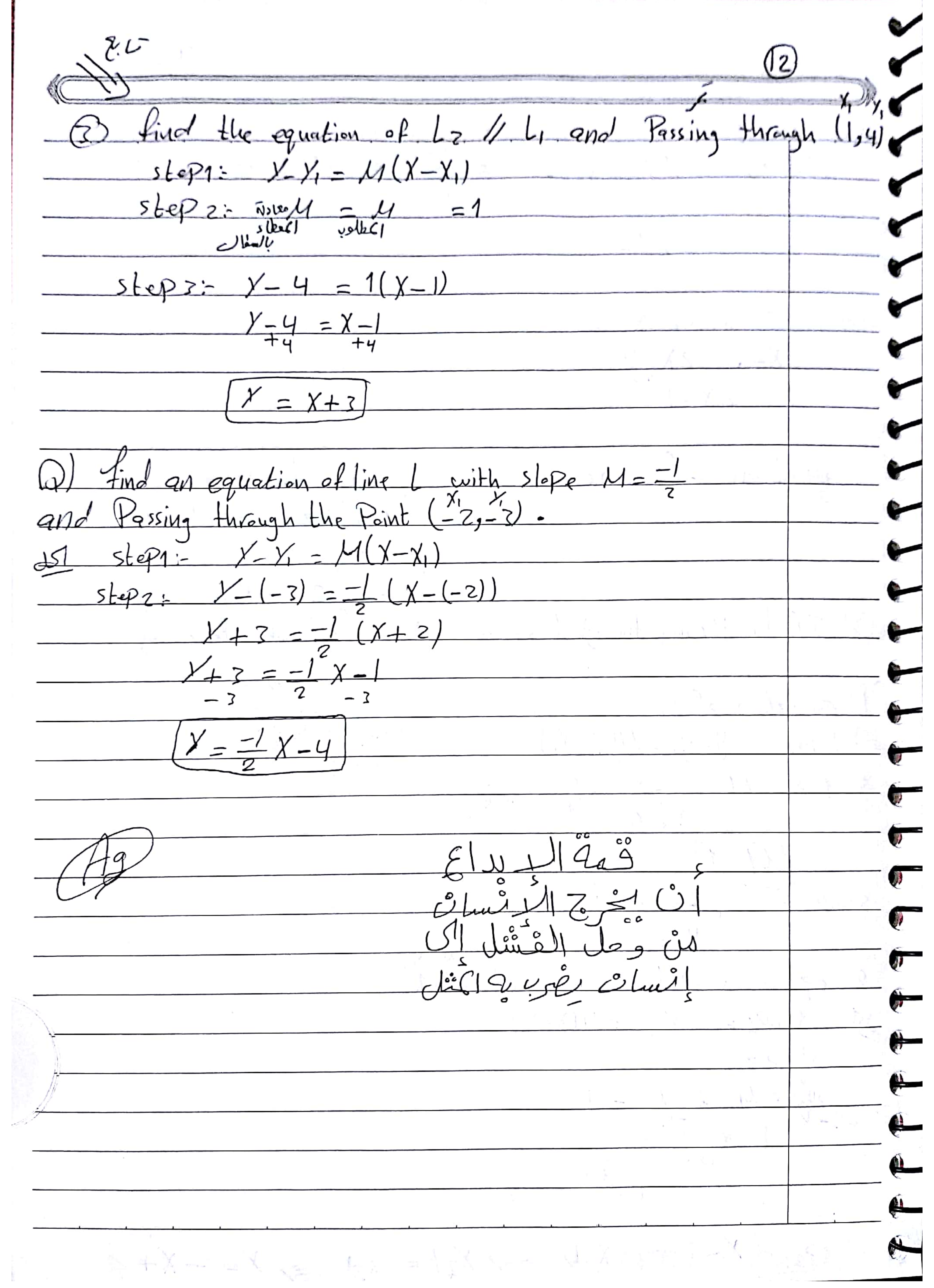
step2:-

معادلة المعطاة بالسؤال $\leftarrow M * M$ المطلوب $= -1$

$1 * M$ مطلوب $= -1$

M مطلوب $= -1$

step3:- $Y - 1 = -1(X - 1) \Rightarrow Y - 1 = -X + 1$ (+1, +1) $\Rightarrow Y = -X + 2$



(3) find the equation of $L_2 \parallel L_1$ and Passing through $(1,4)$ — (x_1, y_1)

step1: $Y - Y_1 = M(X - X_1)$

step2: $M_{\text{المعادلة المعطاة بالسؤال}} = M_{\text{المطلوب}} = 1$

step3: $Y - 4 = 1(X - 1)$

$Y - 4 = X - 1$
$\quad +4 \qquad +4$

$$\boxed{Y = X + 3}$$

Q) find an equation of line L with slope $M = \frac{-1}{2}$ and Passing through the Point $(-2, -3)$ — (x_1, y_1).

الحل step1: $Y - Y_1 = M(X - X_1)$

step2: $Y - (-3) = \frac{-1}{2}(X - (-2))$

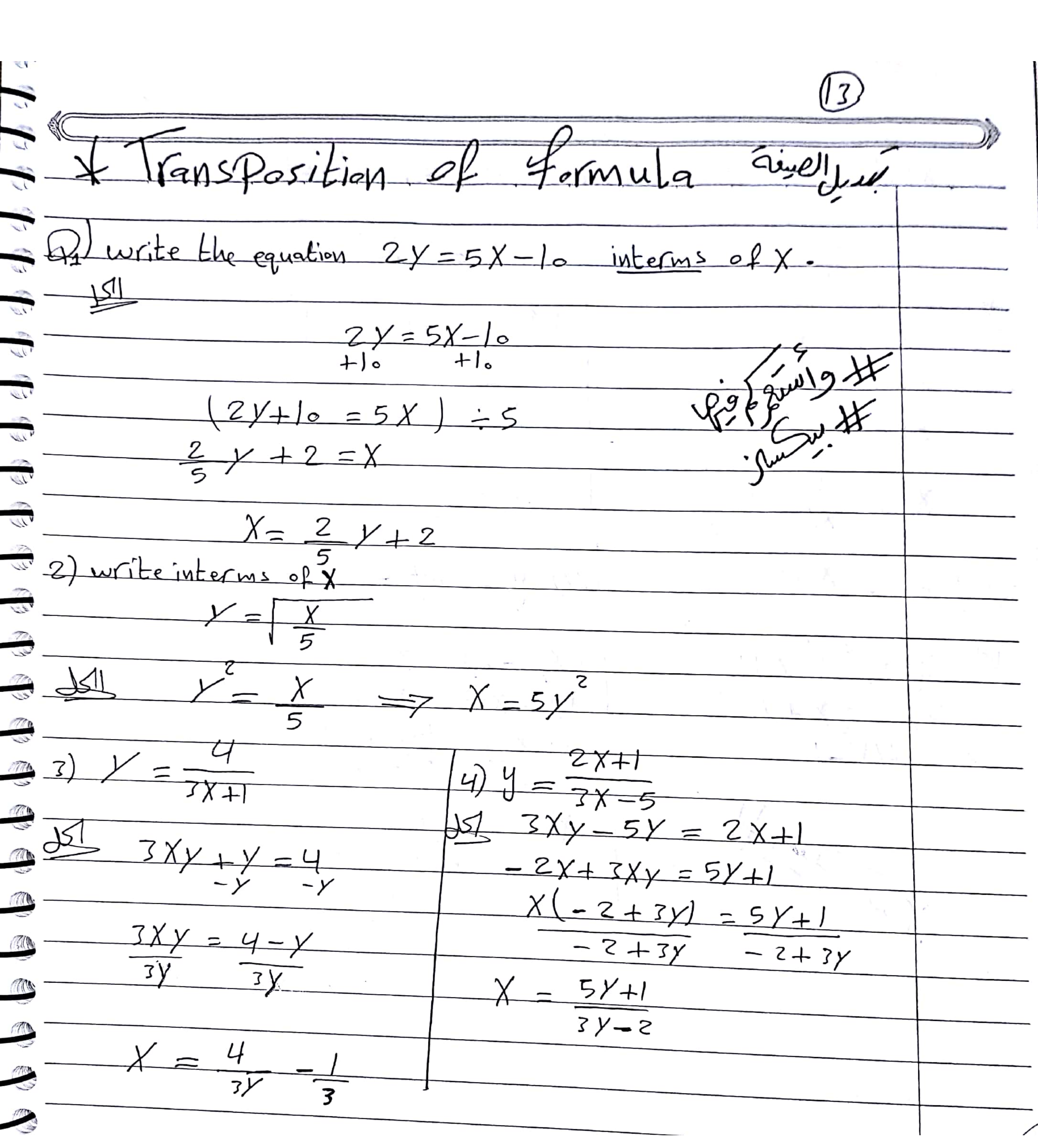
$Y + 3 = \frac{-1}{2}(X + 2)$

$Y + 3 = \frac{-1}{2}X - 1$
$\quad -3 \qquad\qquad -3$

$$\boxed{Y = \frac{-1}{2}X - 4}$$

Ag

قمة الإبداع
أن يخرج الإنسان
من وحل الفشل إلى
إنسان يضرب به المثل



* Transposition of formula تبديل الصيغة

Q1) write the equation $2Y = 5X - 10$ interms of X.

الحل

$$2Y = 5X - 10$$
$$+10 \qquad +10$$
$$(2Y + 10 = 5X) \div 5$$
$$\frac{2}{5}Y + 2 = X$$
$$X = \frac{2}{5}Y + 2$$

2) write interms of X

$$Y = \sqrt{\frac{X}{5}}$$

الحل

$$Y^2 = \frac{X}{5} \Rightarrow X = 5Y^2$$

3) $Y = \dfrac{4}{3X+1}$

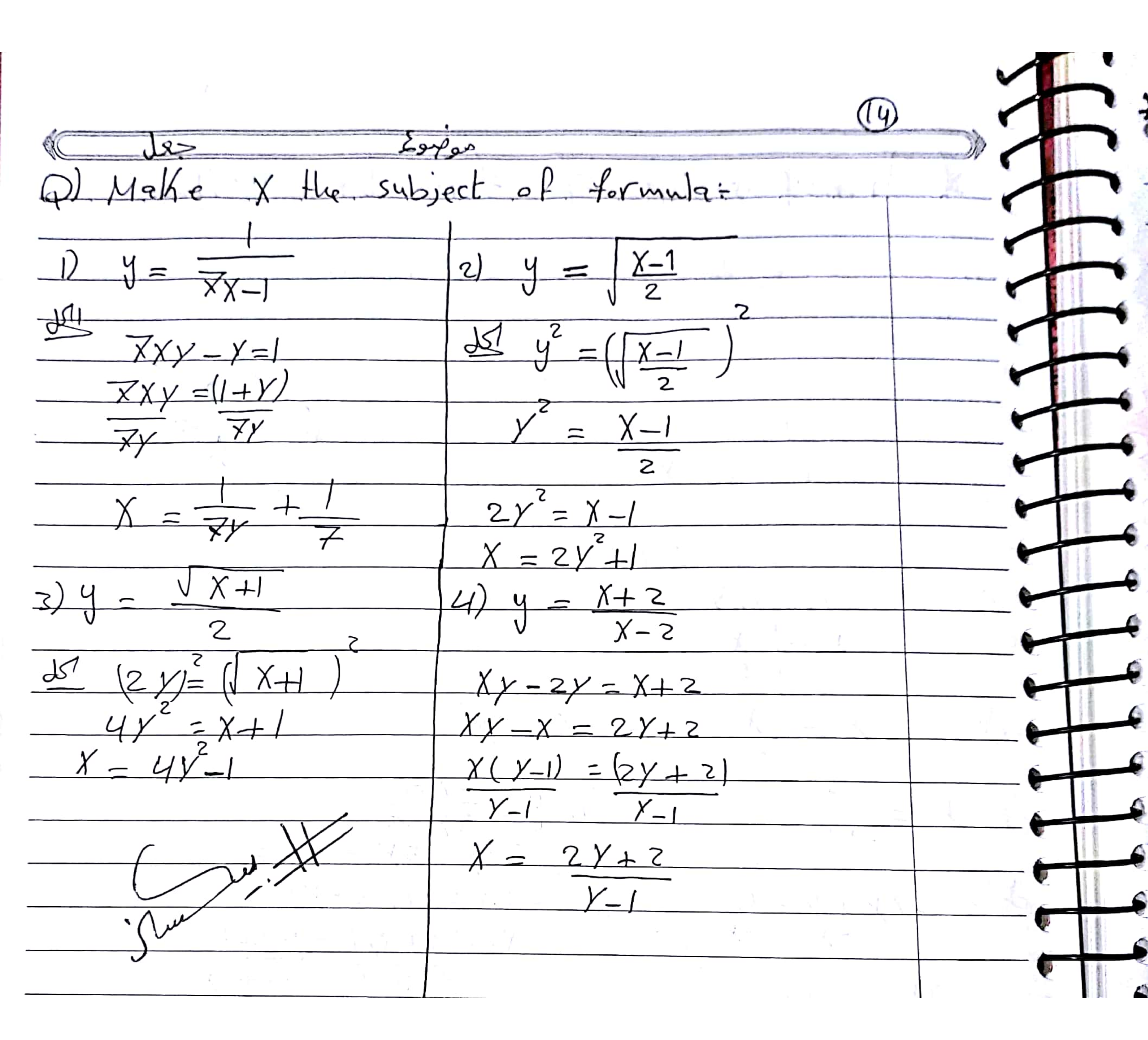
الحل

$$3XY + Y = 4$$
$$-Y \qquad -Y$$
$$\frac{3XY}{3Y} = \frac{4-Y}{3Y}$$
$$X = \frac{4}{3Y} - \frac{1}{3}$$

4) $y = \dfrac{2X+1}{3X-5}$

الحل

$$3Xy - 5Y = 2X + 1$$
$$-2X + 3Xy = 5Y + 1$$
$$\frac{X(-2+3Y)}{-2+3Y} = \frac{5Y+1}{-2+3Y}$$
$$X = \frac{5Y+1}{3Y-2}$$



Q) Make x the subject of formula:

1) $y = \frac{1}{7x-1}$

الحل

$7xy - y = 1$

$\frac{7xy}{7y} = \frac{(1+y)}{7y}$

$x = \frac{1}{7y} + \frac{1}{7}$

2) $y = \sqrt{\frac{x-1}{2}}$

الحل $y^2 = \left(\sqrt{\frac{x-1}{2}}\right)^2$

$y^2 = \frac{x-1}{2}$

$2y^2 = x-1$

$x = 2y^2+1$

3) $y = \frac{\sqrt{x+1}}{2}$

الحل $(2y)^2 = \left(\sqrt{x+1}\right)^2$

$4y^2 = x+1$

$x = 4y^2-1$

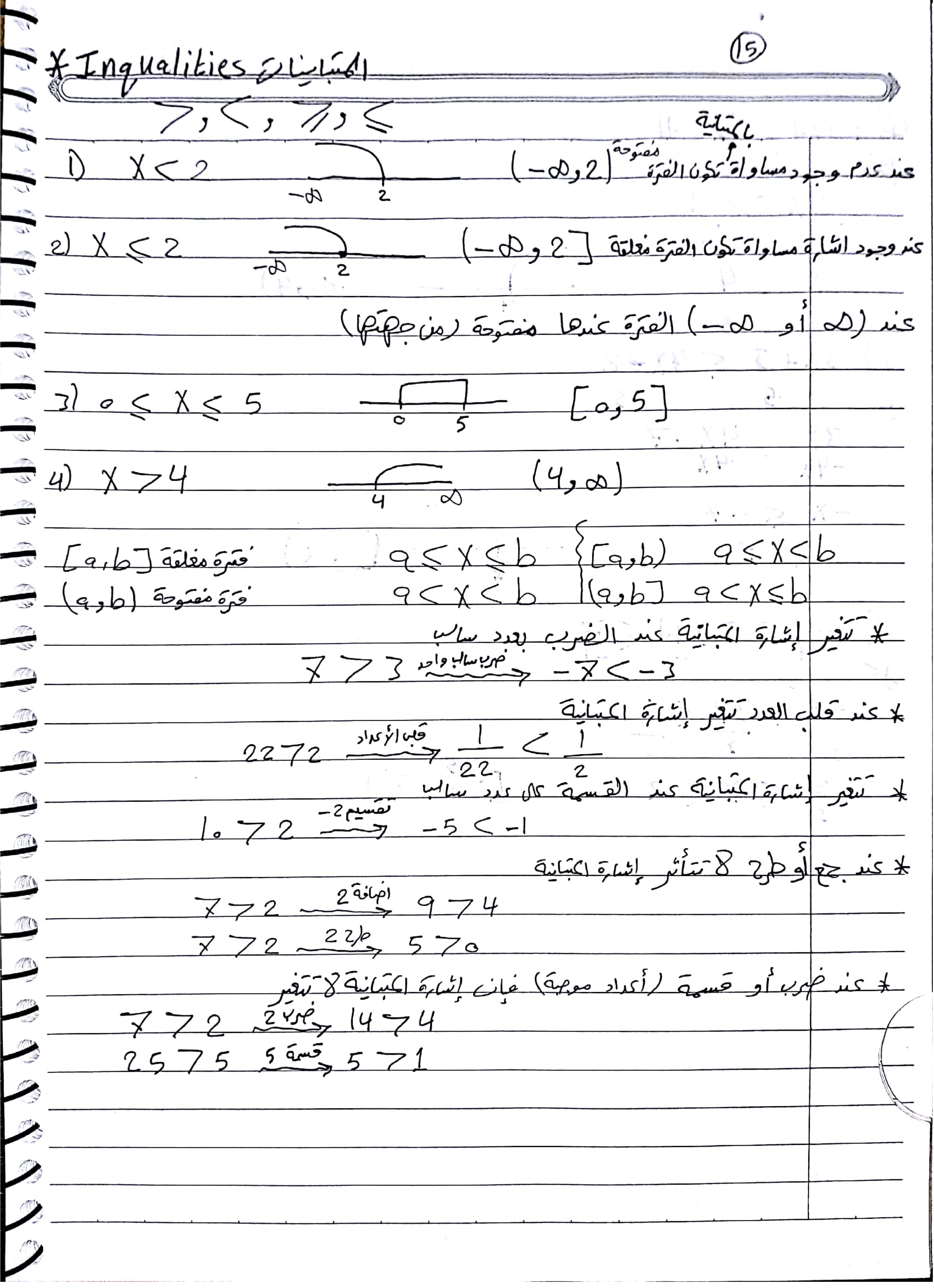
4) $y = \frac{x+2}{x-2}$

$xy - 2y = x+2$

$xy - x = 2y+2$

$\frac{x(y-1)}{y-1} = \frac{(2y+2)}{y-1}$

$x = \frac{2y+2}{y-1}$



* Inqualities المتباينات

$>$, $<$, $\geq$, $\leq$

بالمتباينة

1) $x < 2$ — $(-\infty, 2)$ — عند عدم وجود مساواة تكون الفترة مفتوحة

2) $x \leq 2$ — $(-\infty, 2]$ — عند وجود اشارة مساواة تكون الفترة مغلقة

عند (∞ أو $-\infty$) الفترة عندها مفتوحة (من جهتها)

3) $0 \leq x \leq 5$ — $[0, 5]$

4) $x > 4$ — $(4, \infty)$

$[a,b]$ فترة مغلقة — $a \leq x \leq b$

(a,b) فترة مفتوحة — $a < x < b$

$[a,b)$ — $a \leq x < b$

$(a,b]$ — $a < x \leq b$

* تتغير إشارة المتباينة عند الضرب بعدد سالب

$x > 3 \xrightarrow{\text{ضرب بسالب واحد}} -x < -3$

* عند قلب العدد تتغير إشارة المتباينة

$22 > 2 \xrightarrow{\text{قلب الأعداد}} \frac{1}{22} < \frac{1}{2}$

* تتغير إشارة المتباينة عند القسمة على عدد سالب

$10 > 2 \xrightarrow{\text{تقسيم } -2} -5 < -1$

* عند جمع أو طرح لا تتأثر إشارة المتباينة

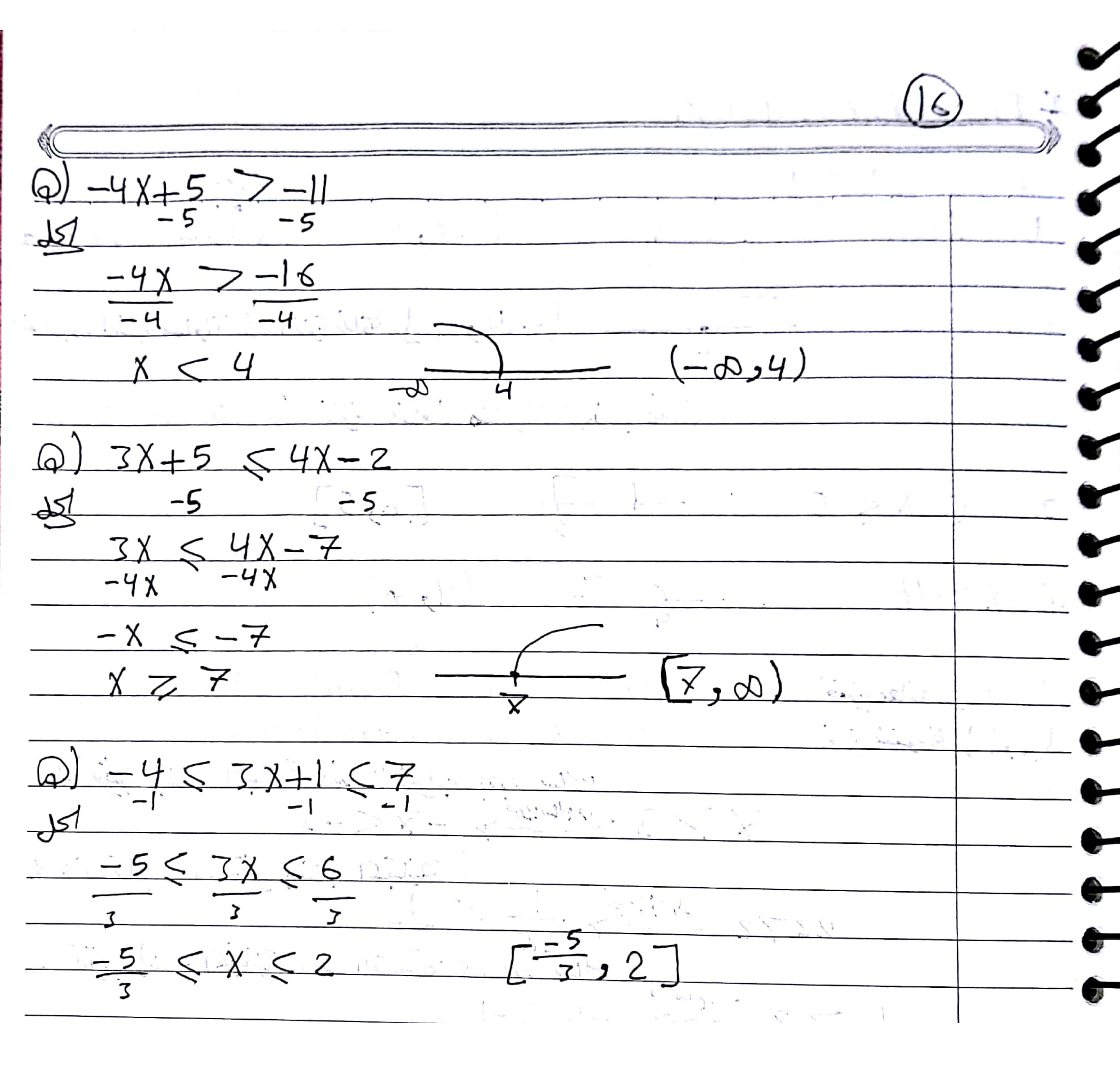
$7 > 2 \xrightarrow{\text{اضافة } 2} 9 > 4$

$7 > 2 \xrightarrow{\text{طرح } 2} 5 > 0$

* عند ضرب أو قسمة (أعداد موجبة) فإن إشارة المتباينة لا تتغير

$7 > 2 \xrightarrow{\text{ضرب } 2} 14 > 4$

$25 > 5 \xrightarrow{\text{قسمة } 5} 5 > 1$



Q) $-4x+5 > -11$

الحل

$-4x + 5 - 5 > -11 - 5$

$\frac{-4x}{-4} > \frac{-16}{-4}$

$x < 4$ $(-\infty, 4)$

Q) $3x+5 \leq 4x-2$

الحل

$3x + 5 - 5 \leq 4x - 2 - 5$

$3x \leq 4x - 7$

$3x - 4x \leq 4x - 7 - 4x$

$-x \leq -7$

$x \geq 7$ $[7, \infty)$

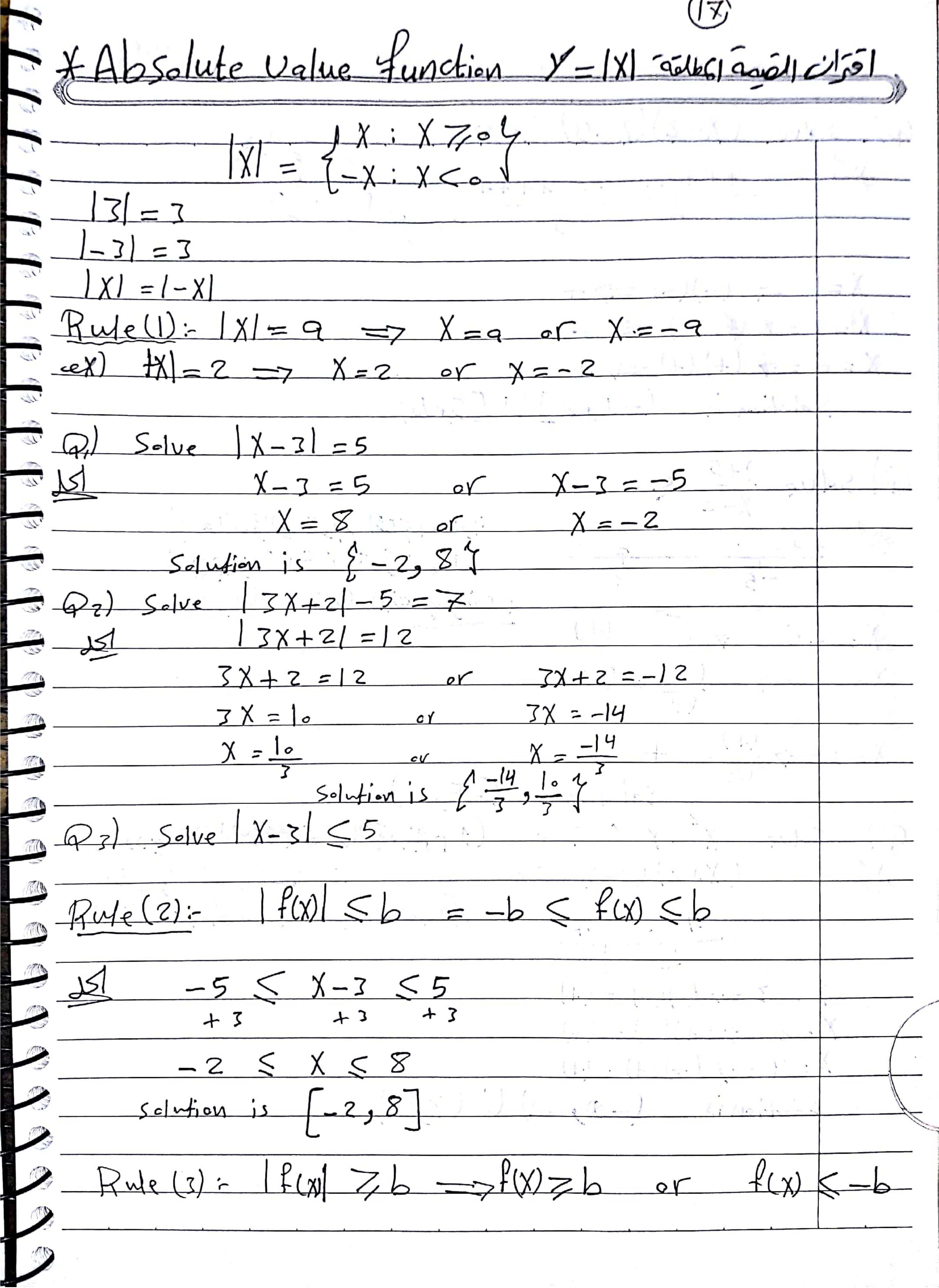
Q) $-4 \leq 3x+1 \leq 7$

الحل

$-4 - 1 \leq 3x + 1 - 1 \leq 7 - 1$

$\frac{-5}{3} \leq \frac{3x}{3} \leq \frac{6}{3}$

$\frac{-5}{3} \leq x \leq 2$ $[\frac{-5}{3}, 2]$



* Absolute Value Function $y = |x|$ اقتران القيمة المطلقة

$$|x| = \begin{cases} x & : x \geq 0 \\ -x & : x < 0 \end{cases}$$

$|3| = 3$

$|-3| = 3$

$|x| = |-x|$

Rule (1):- $|x| = a \implies x = a$ or $x = -a$

ex) $|x| = 2 \implies x = 2$ or $x = -2$

Q1) Solve $|x - 3| = 5$

الحل

$x - 3 = 5$ or $x - 3 = -5$

$x = 8$ or $x = -2$

Solution is $\{-2, 8\}$

Q2) Solve $|3x + 2| - 5 = 7$

الحل

$|3x + 2| = 12$

$3x + 2 = 12$ or $3x + 2 = -12$

$3x = 10$ or $3x = -14$

$x = \frac{10}{3}$ or $x = \frac{-14}{3}$

Solution is $\{\frac{-14}{3}, \frac{10}{3}\}$

Q3) Solve $|x - 3| \leq 5$

Rule (2):- $|f(x)| \leq b = -b \leq f(x) \leq b$

الحل

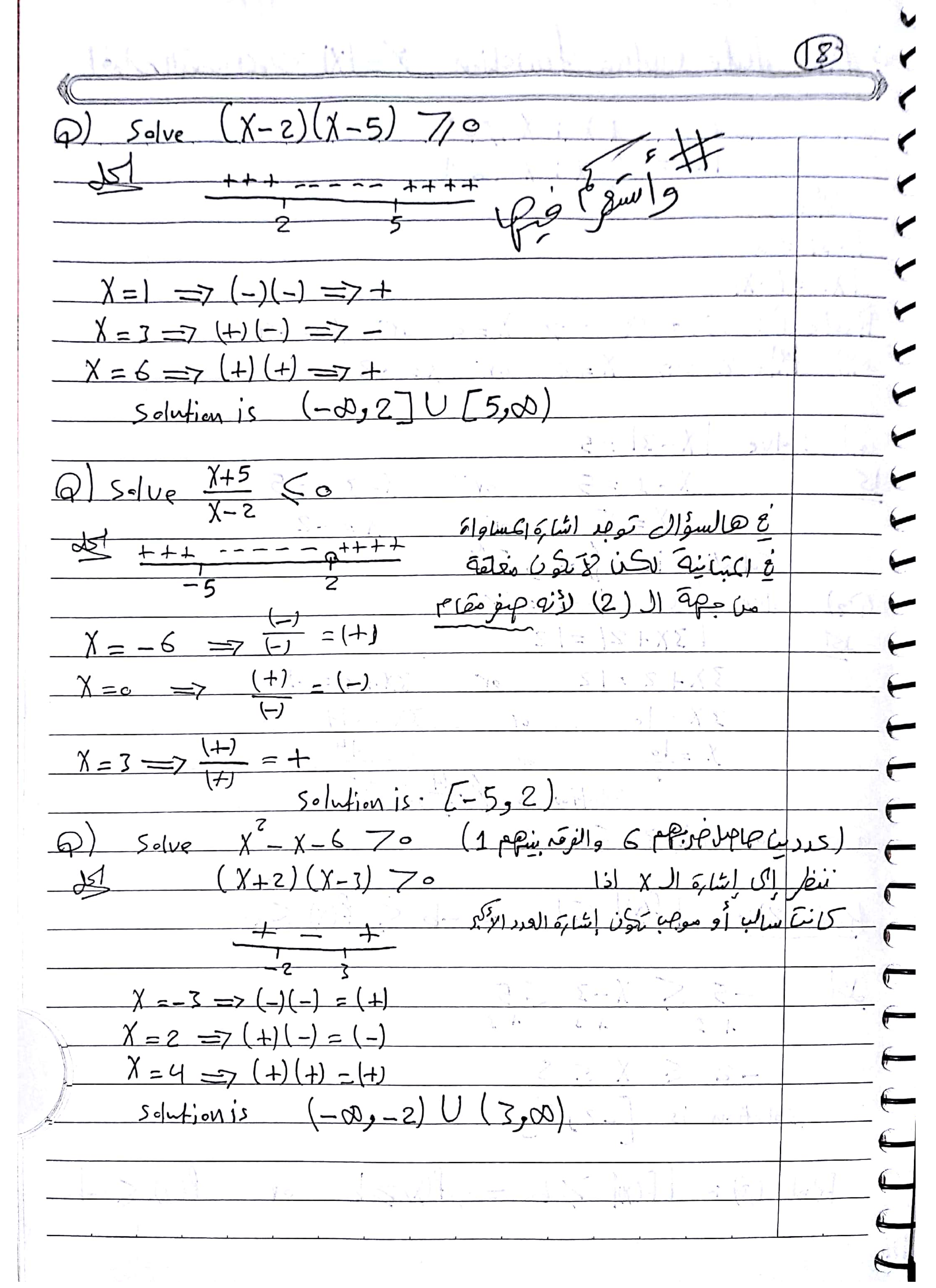
$-5 \leq x - 3 \leq 5$

$+3 \quad\quad +3 \quad\quad +3$

$-2 \leq x \leq 8$

solution is $[-2, 8]$

Rule (3):- $|f(x)| \geq b \implies f(x) \geq b$ or $f(x) \leq -b$



Q) Solve $(x-2)(x-5) \geq 0$

الحل

$$\begin{array}{ccccc} +++ & & ------ & & ++++ \\ \hline & 2 & & 5 & \end{array}$$

وأسعركم فيهم #

$x = 1 \Rightarrow (-)(-) \Rightarrow +$

$x = 3 \Rightarrow (+)(-) \Rightarrow -$

$x = 6 \Rightarrow (+)(+) \Rightarrow +$

solution is $(-\infty, 2] \cup [5, \infty)$

Q) Solve $\frac{x+5}{x-2} \leq 0$

الحل

$$\begin{array}{ccccc} +++ & & ------ & & ++++ \\ \hline & -5 & & 2 & \end{array}$$

في هالسؤال توجد اشارة المساواة
في المتباينة لكن لا تكون مغلقة
من جهة ال (2) لأنه صفر مقام

$x = -6 \Rightarrow \frac{(-)}{(-)} = (+)$

$x = 0 \Rightarrow \frac{(+)}{(-)} = (-)$

$x = 3 \Rightarrow \frac{(+)}{(+)} = +$

solution is $[-5, 2)$

Q) Solve $x^2 - x - 6 > 0$ (عددين حاصل ضربهم 6 والفرق بينهم 1)

الحل $(x+2)(x-3) > 0$

ننظر إلى إشارة ال x اذا
كانت سالب أو موجب تكون إشارة العدد الأكبر

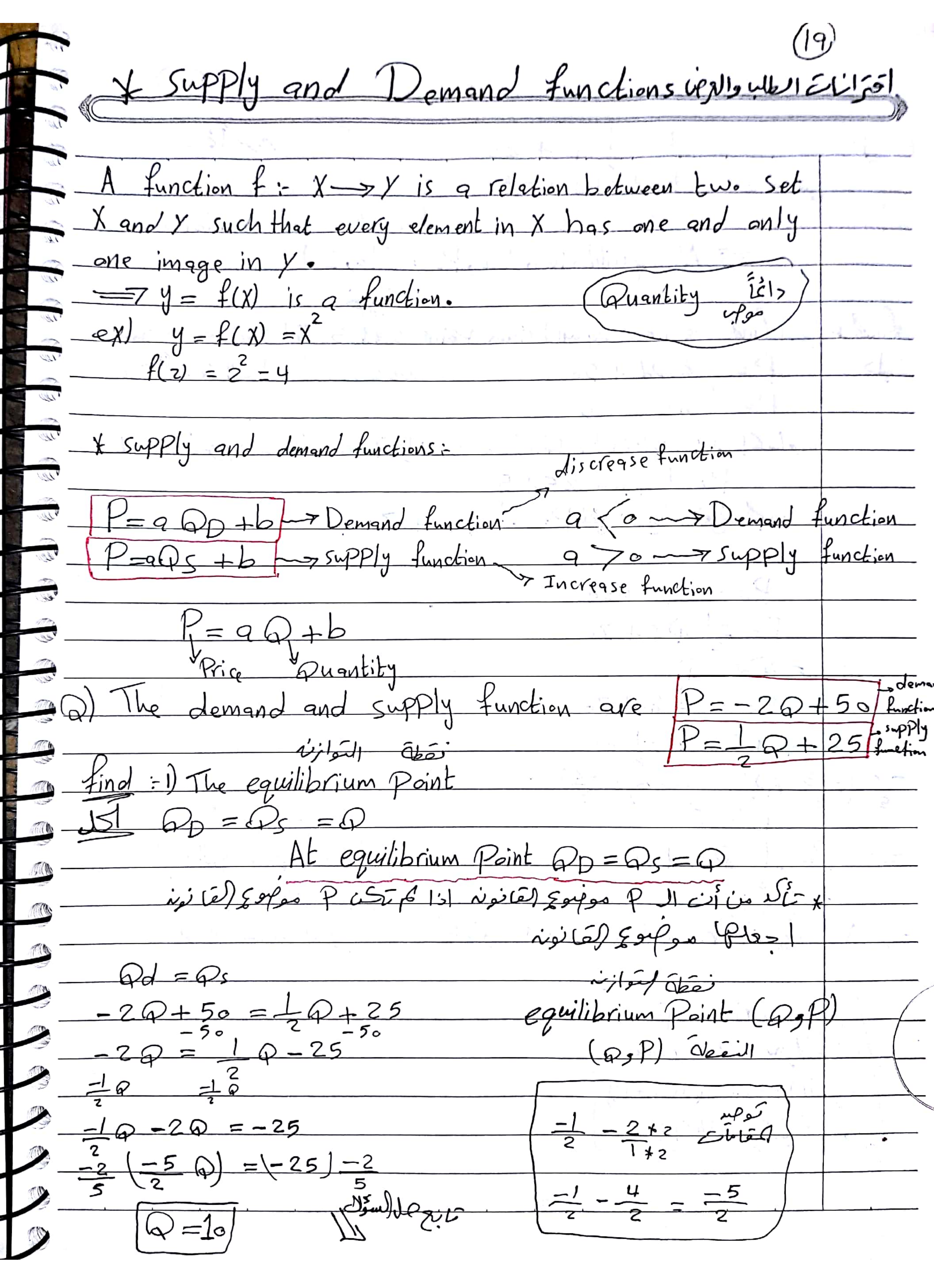
$$\begin{array}{ccccc} + & & - & & + \\ \hline & -2 & & 3 & \end{array}$$

$x = -3 \Rightarrow (-)(-) = (+)$

$x = 2 \Rightarrow (+)(-) = (-)$

$x = 4 \Rightarrow (+)(+) = (+)$

solution is $(-\infty, -2) \cup (3, \infty)$



* Supply and Demand functions اقترانات الطلب والعرض

A function $f: X \to Y$ is a relation between two set X and Y such that every element in X has one and only one image in Y.

$\Rightarrow y = f(x)$ is a function.

Quantity داخلة موجب

ex) $y = f(x) = x^2$

$f(2) = 2^2 = 4$

* supply and demand functions:

$P = aQ_D + b$ → Demand function → discrease function

$P = aQ_S + b$ → supply function → Increase function

$a < 0$ → Demand function

$a > 0$ → supply function

$P = aQ + b$

P → Price, Q → Quantity

Q) The demand and supply function are $P = -2Q + 50$ → demand function, $P = \frac{1}{2}Q + 25$ → supply function

find : 1) The equilibrium Point نقطة التوازن

أكمل $Q_D = Q_S = Q$

At equilibrium Point $Q_D = Q_S = Q$

* تأكد من أن الـ P موضوع القانون اذا لم تكن P موضوع القانون اجعلها موضوع القانون

نقطة التوازن

equilibrium Point (Q, P)

النقطة (Q, P)

$Q_d = Q_s$

$-2Q + 50 = \frac{1}{2}Q + 25$

$\quad\;\; -50 \qquad\quad\;\; -50$

$-2Q = \frac{1}{2}Q - 25$

$-\frac{1}{2}Q \qquad -\frac{1}{2}Q$

$-\frac{1}{2}Q - 2Q = -25$

$\frac{-2}{5}\left(\frac{-5}{2}Q\right) = (-25)\frac{-2}{5}$

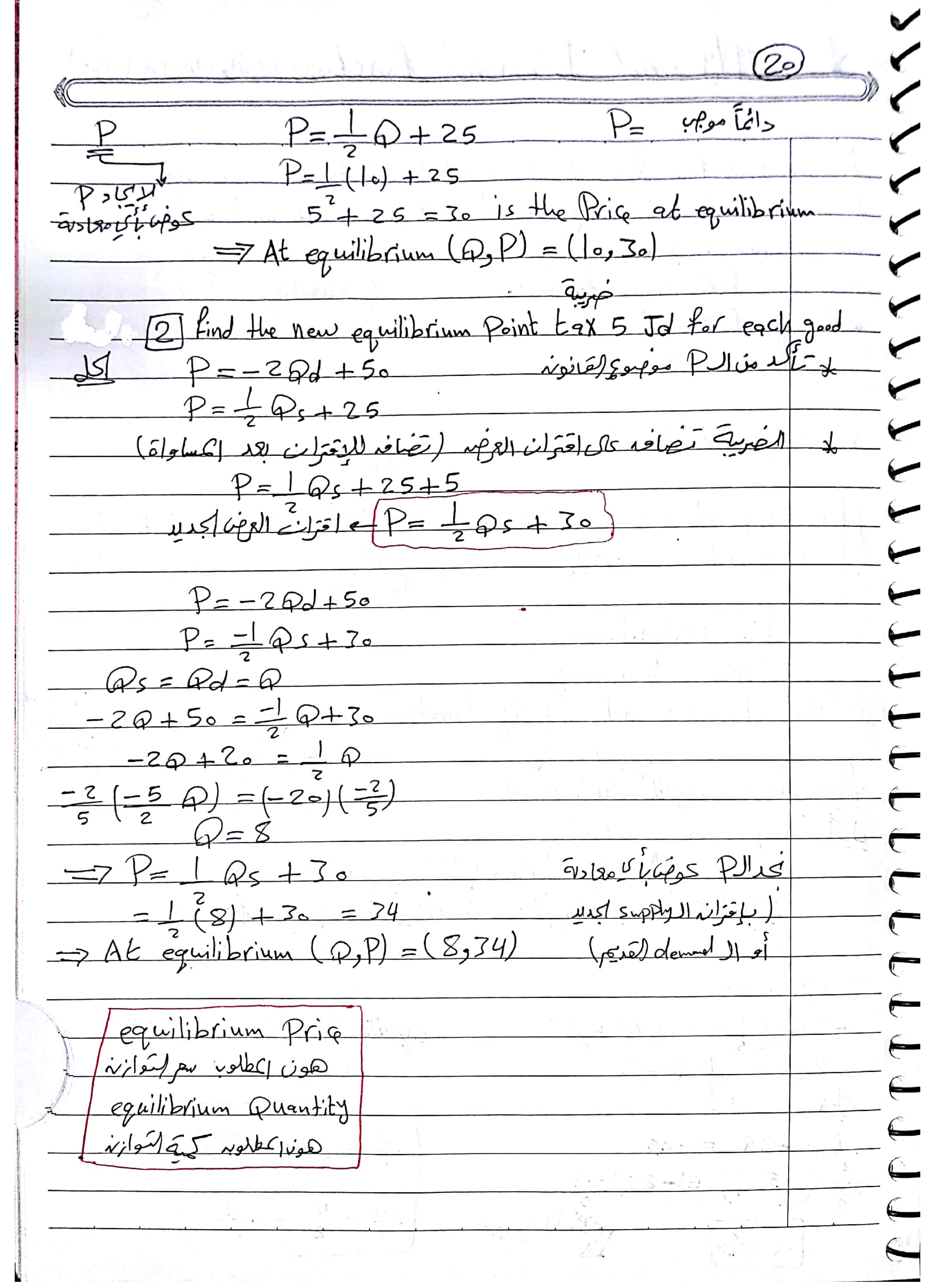
$\boxed{Q = 10}$

تابع حل السؤال

توحيد المقامات

$\frac{-1}{2} - \frac{2 * 2}{1 * 2}$

$\frac{-1}{2} - \frac{4}{2} = \frac{-5}{2}$



$P = \frac{1}{2}Q + 25$ — P= دائماً موجب

$P = \frac{1}{2}(10) + 25$

$5 + 25 = 30$ is the Price at equilibrium

P ← لإيجاد P عوض بأي معادلة

$\Rightarrow$ At equilibrium $(Q, P) = (10, 30)$

ضريبة

[2] Find the new equilibrium Point tax 5 Jd for each good

* تأكد من ال P موضوع القانون

اكمل

$P = -2Q_d + 50$

$P = \frac{1}{2}Q_s + 25$

* الضريبة تضاف على اقتران العرض (تضاف للإقتران بعد المساواة)

$P = \frac{1}{2}Q_s + 25 + 5$

$P = \frac{1}{2}Q_s + 30$ ← اقتران العرض الجديد

$P = -2Q_d + 50$

$P = \frac{-1}{2}Q_s + 30$

$Q_s = Q_d = Q$

$-2Q + 50 = \frac{-1}{2}Q + 30$

$-2Q + 20 = \frac{1}{2}Q$

$\frac{-2}{5}\left(\frac{-5}{2}Q\right) = (-20)\left(\frac{-2}{5}\right)$

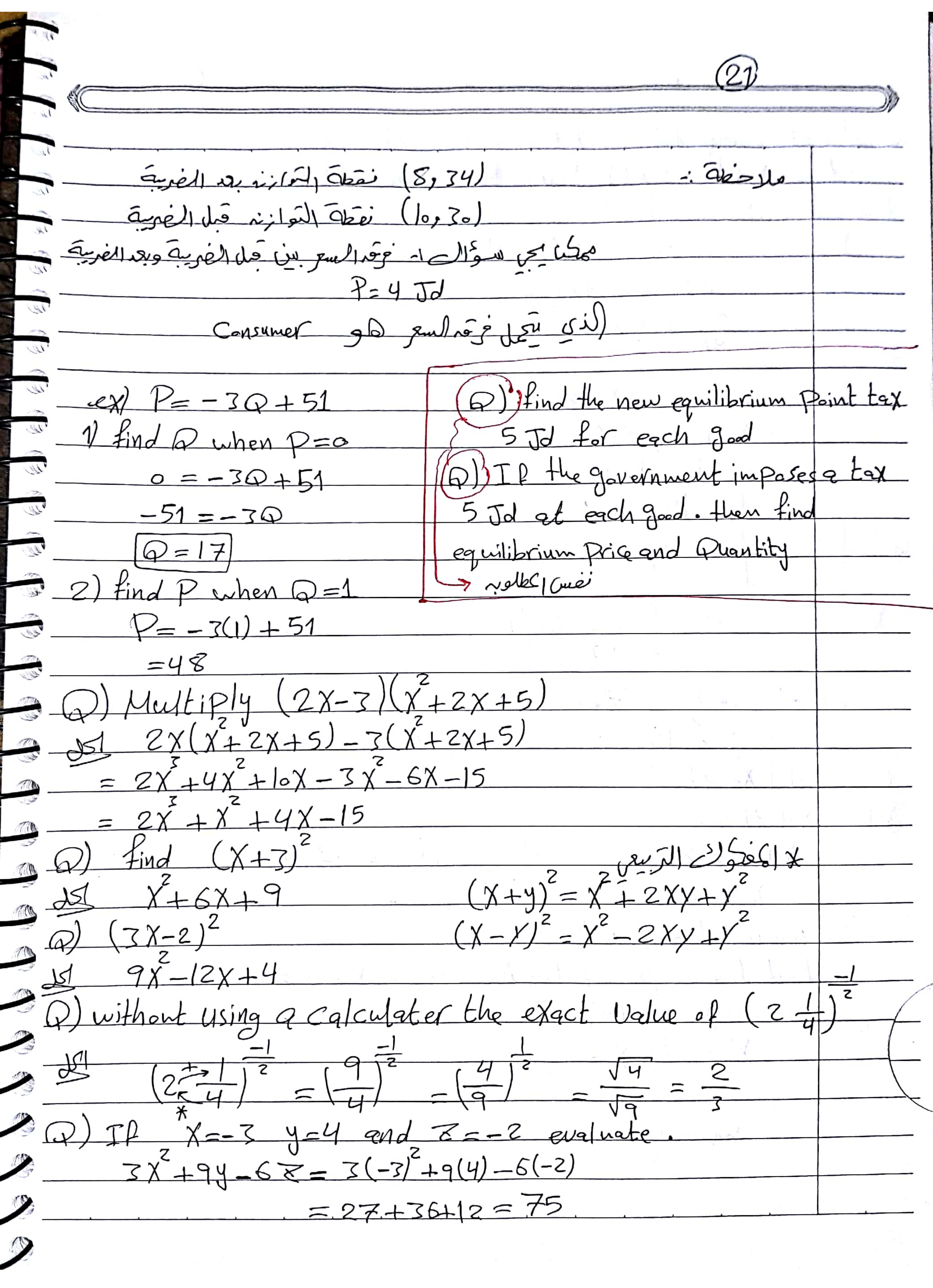
$Q = 8$

$\Rightarrow P = \frac{1}{2}Q_s + 30$ — نجد ال P عوضها بأي معادلة

$= \frac{1}{2}(8) + 30 = 34$ — (باقتران ال supply الجديد

$\Rightarrow$ At equilibrium $(Q, P) = (8, 34)$ — أو ال demand القديم)

equilibrium Price
هون المطلوب سعر التوازن
equilibrium Quantity
هون المطلوب كمية التوازن



ملاحظة :- نقطة التوازن بعد الضريبة $(8,34)$

نقطة التوازن قبل الضريبة $(10,30)$

ممكن يجي سؤال :- فرق السعر بين قبل الضريبة وبعد الضريبة

$P=4$ Jd

الذي يتحمل فرق السعر هو Consumer

Q) find the new equilibrium Point tax 5 Jd for each good

Q) If the government imposes a tax 5 Jd at each good. then find equilibrium Price and Quantity

→ نفس المطلوب

ex) $P=-3Q+51$

1) find Q when $P=0$

$0=-3Q+51$

$-51=-3Q$

$Q=17$

2) find P when $Q=1$

$P=-3(1)+51$

$=48$

Q) Multiply $(2X-3)(X^2+2X+5)$

الحل $2X(X^2+2X+5)-3(X^2+2X+5)$

$=2X^3+4X^2+10X-3X^2-6X-15$

$=2X^3+X^2+4X-15$

Q) find $(X+3)^2$

الحل X^2+6X+9

Q) $(3X-2)^2$

الحل $9X^2-12X+4$

* المفكوك التربيعي

$(X+y)^2=X^2+2XY+Y^2$

$(X-Y)^2=X^2-2XY+Y^2$

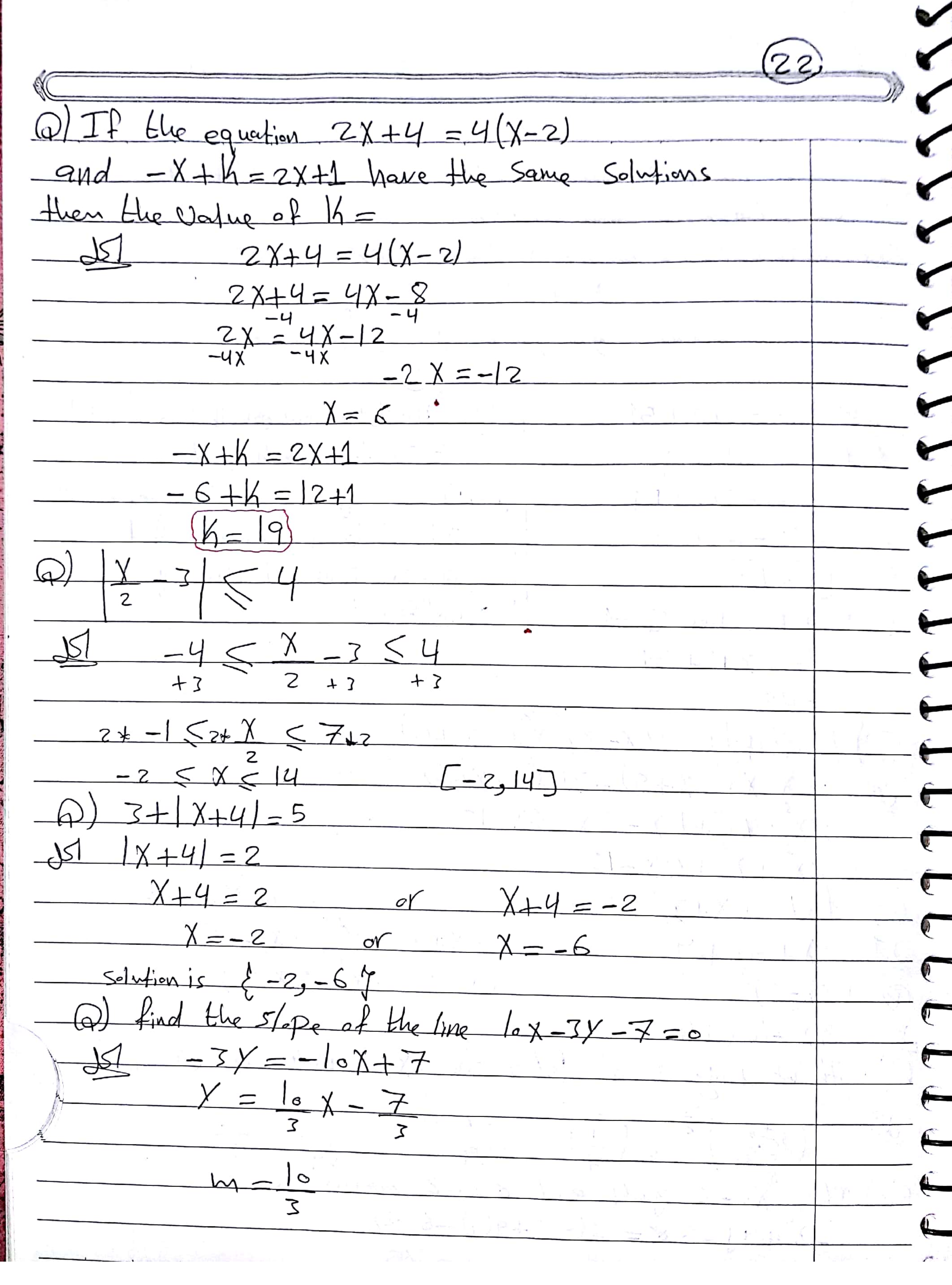
Q) without using a calculater the exact Value of $(2\frac{1}{4})^{\frac{-1}{2}}$

الحل $(2\frac{1}{4})^{\frac{-1}{2}}=(\frac{9}{4})^{\frac{-1}{2}}=(\frac{4}{9})^{\frac{1}{2}}=\frac{\sqrt{4}}{\sqrt{9}}=\frac{2}{3}$

Q) If $X=-3$ $y=4$ and $Z=-2$ evaluate.

$3X^2+9y-6Z=3(-3)^2+9(4)-6(-2)$

$=27+36+12=75$



Q) If the equation $2X+4=4(X-2)$ and $-X+k=2X+1$ have the same solutions then the value of $k=$

حل
$$2X+4=4(X-2)$$
$$2X+4=4X-8$$
$$\quad -4 \qquad\quad -4$$
$$2X=4X-12$$
$$-4X \quad -4X$$
$$-2X=-12$$
$$X=6$$
$$-X+k=2X+1$$
$$-6+k=12+1$$
$$k=19$$

Q) $\left|\frac{X}{2}-3\right|\leq 4$

حل
$$-4\leq\frac{X}{2}-3\leq 4$$
$$+3 \qquad\quad +3 \qquad +3$$
$$2*\ -1\leq 2*\frac{X}{2}\leq 7*2$$
$$-2\leq X\leq 14$$
$[-2,14]$

Q) $3+|X+4|=5$

حل $|X+4|=2$

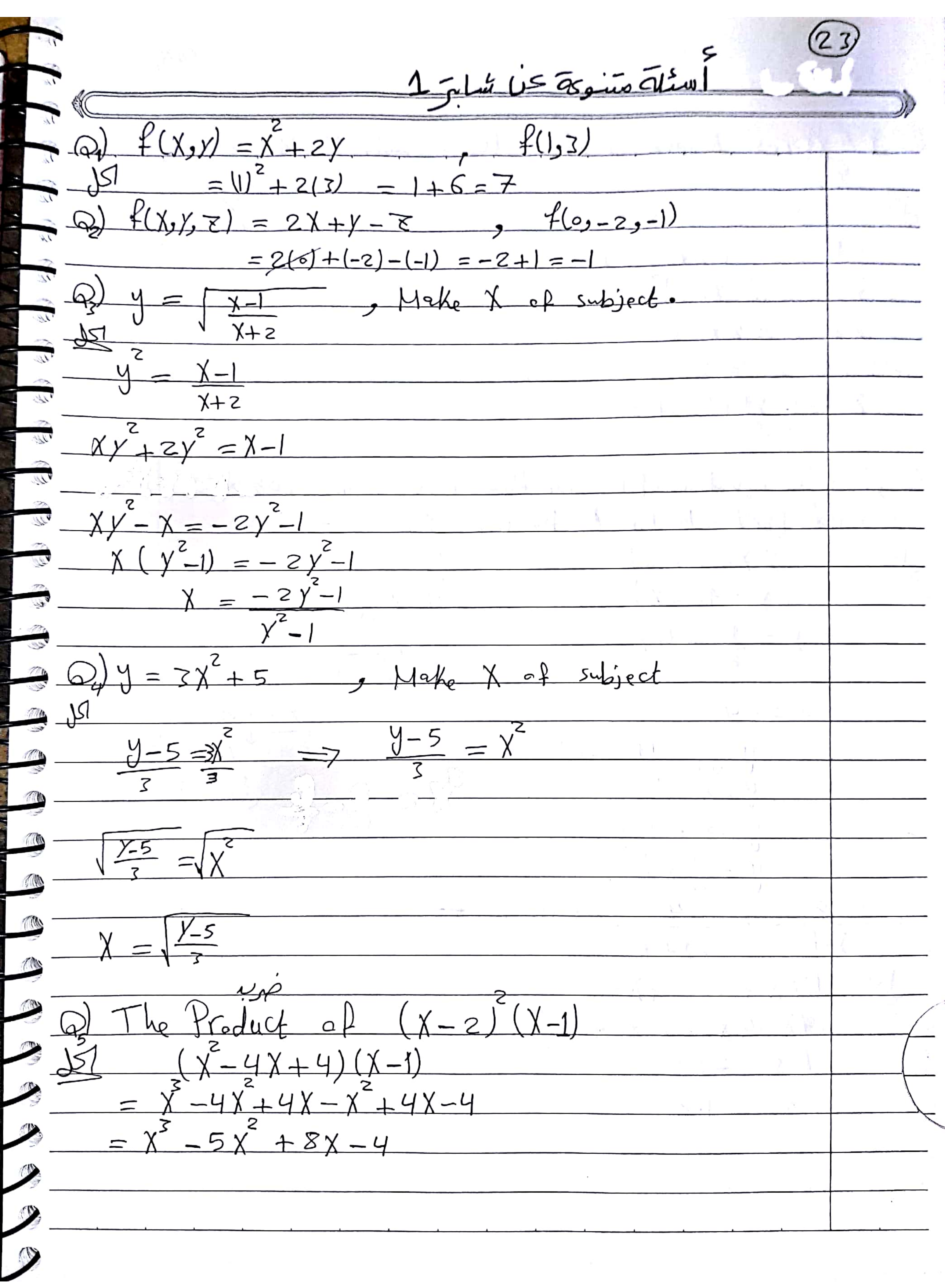
$X+4=2$ or $X+4=-2$

$X=-2$ or $X=-6$

solution is $\{-2,-6\}$

Q) find the slope of the line $10X-3Y-7=0$

حل
$$-3Y=-10X+7$$
$$Y=\frac{10}{3}X-\frac{7}{3}$$
$$m=\frac{10}{3}$$



أسئلة متنوعة عن شابتر 1

Q1) $f(x,y) = x^2 + 2y$, $f(1,3)$

الحل $= (1)^2 + 2(3) = 1 + 6 = 7$

Q2) $f(x,y,z) = 2x + y - z$, $f(0,-2,-1)$

$= 2(0) + (-2) - (-1) = -2 + 1 = -1$

Q3) $y = \sqrt{\frac{x-1}{x+2}}$, Make x of subject.

الحل

$y^2 = \frac{x-1}{x+2}$

$xy^2 + 2y^2 = x - 1$

$xy^2 - x = -2y^2 - 1$

$x(y^2 - 1) = -2y^2 - 1$

$x = \frac{-2y^2 - 1}{y^2 - 1}$

Q4) $y = 3x^2 + 5$, Make x of subject

الحل

$\frac{y-5}{3} = \frac{3x^2}{3} \Rightarrow \frac{y-5}{3} = x^2$

$\sqrt{\frac{y-5}{3}} = \sqrt{x^2}$

$x = \sqrt{\frac{y-5}{3}}$

Q5) The Product (ضرب) of $(x-2)^2(x-1)$

الحل $(x^2 - 4x + 4)(x - 1)$

$= x^3 - 4x^2 + 4x - x^2 + 4x - 4$

$= x^3 - 5x^2 + 8x - 4$

Q6) Express X interms of Y the formula $Y = 2 - \sqrt{2X-3}$

$X =$

$$Y = 2 - \sqrt{2X-3}$$

$$(Y - 2 = -\sqrt{2X-3}) * -1$$

$$(-Y+2)^2 = (\sqrt{2X-3})^2$$

$$(-Y+2)^2 = 2X - 3$$

$$(-Y+2)^2 + 3 = 2X$$

$$X = \frac{(-Y+2)^2 + 3}{2}$$

Q7) The equation of the line that has Y-intercept 2 and Perbendicular to the line $8X + 2Y = 1$ is :

$$8X + 2Y = 1$$

$$(2Y = 1 - 8X) \div 2$$

$$Y = \frac{1}{2} - 4X$$

$m = -4$

$$M \cdot M = -1$$

$$-4 \cdot M = -1$$

$$M = \frac{1}{4}$$

Y-intercept 2 → $X = 0$, $Y = 2$ → $(0, 2)$

$$y - y_1 = M(X - X_1)$$

$$y - 2 = \frac{1}{4}(X - 0)$$

$$y - 2 = \frac{1}{4}X$$

$$y = \frac{1}{4}X + 2$$

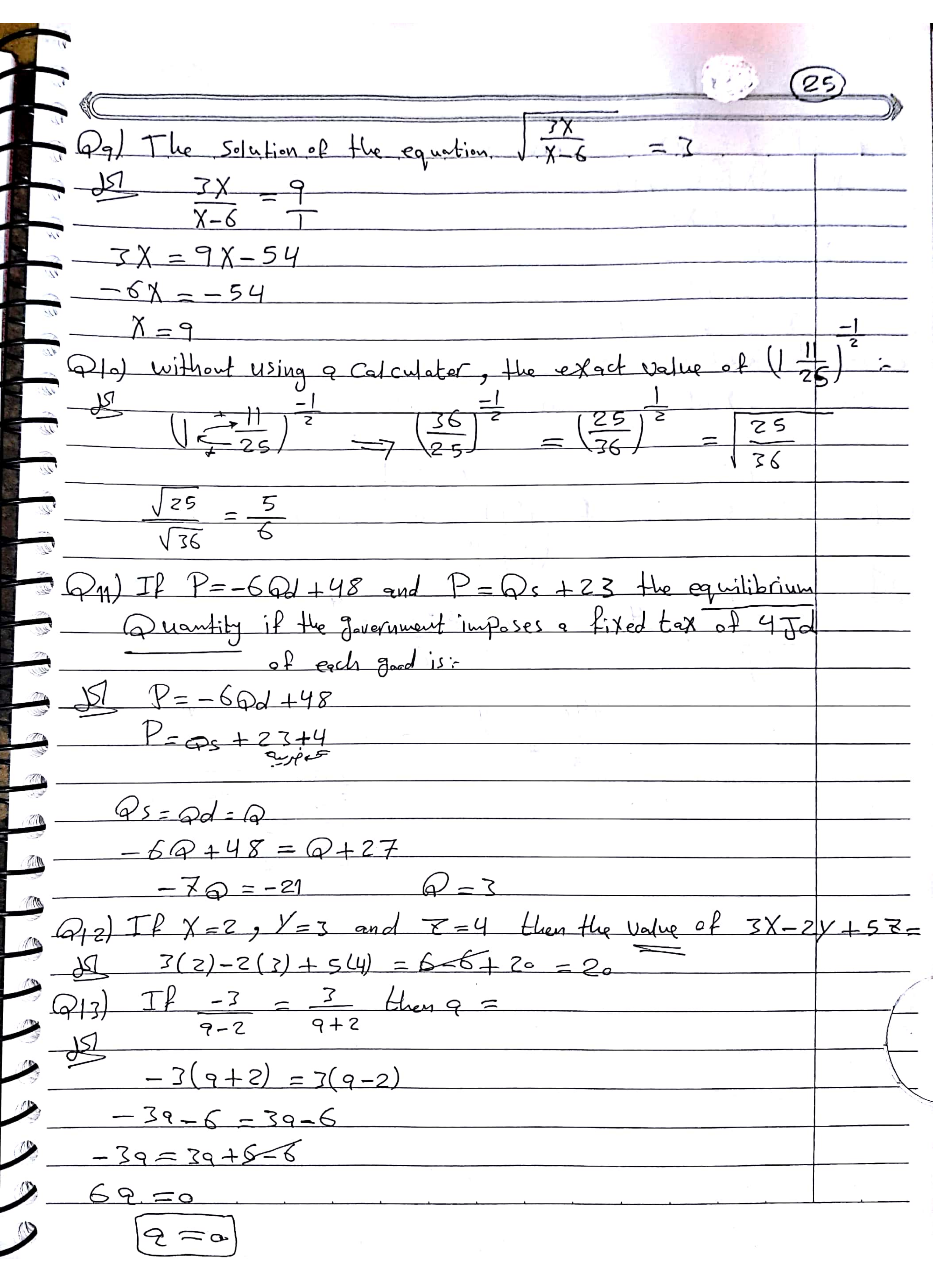
Q8) $\frac{2}{X-1} = \frac{4}{7X+4}$ then $X =$

$$14X + 8 = 4X - 4$$

$$14X - 4X = -8 - 4$$

$$10X = -12$$

$$X = -1.2$$



Q9) The solution of the equation $\sqrt{\frac{3X}{X-6}} = 3$

الحل $\frac{3X}{X-6} = \frac{9}{1}$

$3X = 9X - 54$

$-6X = -54$

$X = 9$

Q10) without using a Calculator, the exact value of $\left(1\frac{11}{25}\right)^{\frac{-1}{2}}$:-

الحل $\left(1\frac{11}{25}\right)^{\frac{-1}{2}} \Rightarrow \left(\frac{36}{25}\right)^{\frac{-1}{2}} = \left(\frac{25}{36}\right)^{\frac{1}{2}} = \sqrt{\frac{25}{36}}$

$\frac{\sqrt{25}}{\sqrt{36}} = \frac{5}{6}$

Q11) If $P = -6Qd + 48$ and $P = Qs + 23$ the equilibrium Quantity if the government imposes a fixed tax of 4 Jd of each good is:-

الحل $P = -6Qd + 48$

$P = Qs + 23 + 4$ (ضريبة)

$Qs = Qd = Q$

$-6Q + 48 = Q + 27$

$-7Q = -21$ $\quad Q = 3$

Q12) If $X = 2$, $Y = 3$ and $Z = 4$ then the value of $3X - 2Y + 5Z =$

الحل $3(2) - 2(3) + 5(4) = 6 - 6 + 20 = 20$

Q13) If $\frac{-3}{a-2} = \frac{3}{a+2}$ then $a =$

الحل

$-3(a+2) = 3(a-2)$

$-3a - 6 = 3a - 6$

$-3a = 3a + 6 - 6$

$6a = 0$

$a = 0$

Q14) If $X = \sqrt{2X+3}$ then X

الحل $(X)^2 = (\sqrt{2X+3})^2$

$X^2 = 2X+3$

$X^2 - 2X - 3 = 0$

$(X-3)(X+1)$

$X = 3$, $X = -1$

Q15) $|5X+4| > 9$

الحل $5X+4 > 9$ or $5X+4 < -9$

$-4 \quad -4 \qquad -4 \quad -4$

$5X > 5$ or $5X < -13$

$X > 1$ or $X < \frac{-13}{5}$

Q16) The solution of $\frac{9(3^X)^2}{(\sqrt{3})^6} = 81$ is $X =$

الحل $\frac{3^2 \cdot 3^{2X}}{(3^{\frac{1}{2}})^6} = 3^4 \Rightarrow \frac{3^2 \cdot 3^{2X}}{3^3} = 3^4$

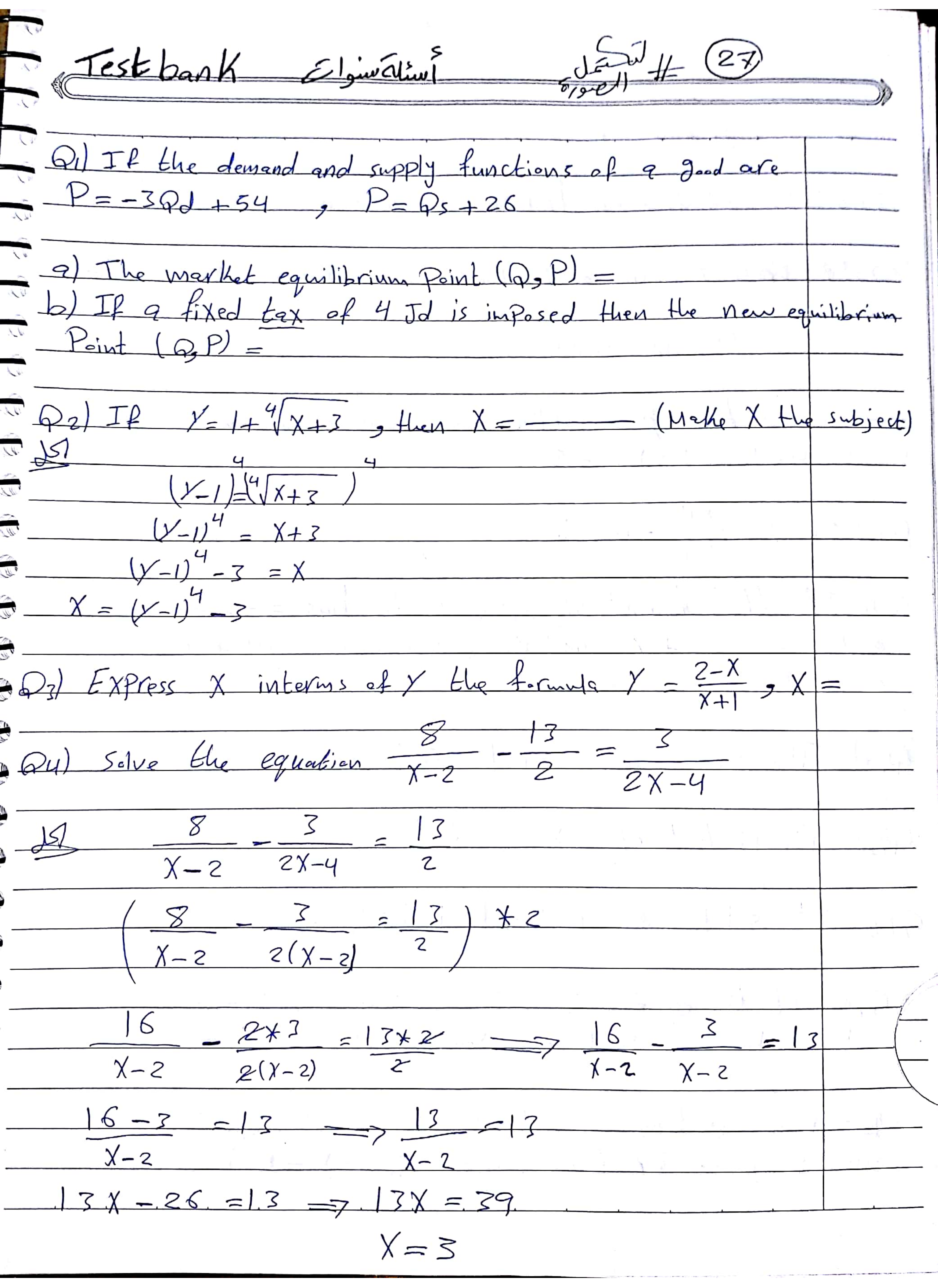
$\frac{3^{2+2X}}{3^3} = 3^4 \Rightarrow 3^{2+2X} = 3^7$

$2 + 2X = 7$

$-2 \qquad -2$

$2X = 5$

$\boxed{X = \frac{5}{2}}$



Q1) If the demand and supply functions of a good are
$P = -3Q_d + 54$, $P = Q_s + 26$

a) The market equilibrium Point (Q, P) =
b) If a fixed tax of 4 Jd is imposed then the new equilibrium Point (Q, P) =

Q2) If $Y = 1 + \sqrt[4]{X+3}$, then X = ______ (Make X the subject)

الحل

$$(Y-1)^4 = \left(\sqrt[4]{X+3}\right)^4$$

$$(Y-1)^4 = X+3$$

$$(Y-1)^4 - 3 = X$$

$$X = (Y-1)^4 - 3$$

Q3) Express X in terms of Y the formula $Y = \frac{2-X}{X+1}$, X =

Q4) Solve the equation $\frac{8}{X-2} - \frac{13}{2} = \frac{3}{2X-4}$

الحل

$$\frac{8}{X-2} - \frac{3}{2X-4} = \frac{13}{2}$$

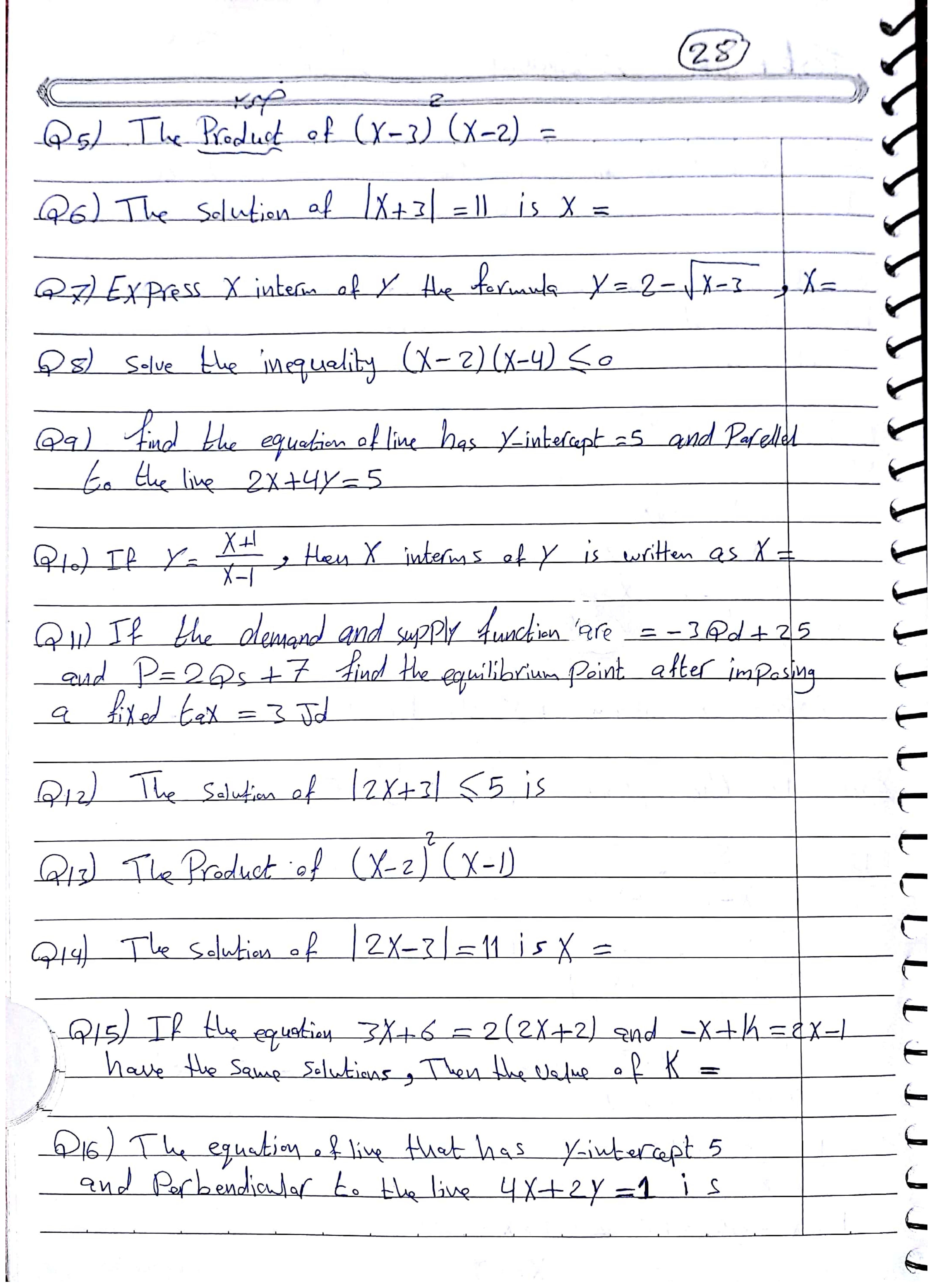
$$\left(\frac{8}{X-2} - \frac{3}{2(X-2)} = \frac{13}{2}\right) * 2$$

$$\frac{16}{X-2} - \frac{2*3}{2(X-2)} = \frac{13*2}{2} \Longrightarrow \frac{16}{X-2} - \frac{3}{X-2} = 13$$

$$\frac{16-3}{X-2} = 13 \Longrightarrow \frac{13}{X-2} = 13$$

$$13X - 26 = 13 \Longrightarrow 13X = 39$$

$$X = 3$$



Q5) The Product of $(X-3)^2(X-2)$ =

Q6) The Solution of $|X+3| = 11$ is X =

Q7) Express X interm of Y the formula $Y = 2 - \sqrt{X-3}$, X =

Q8) Solve the inequality $(X-2)(X-4) \leq 0$

Q9) find the equation of line has Y-intercept $= 5$ and Parellel to the line $2X + 4Y = 5$

Q10) If $Y = \frac{X+1}{X-1}$, then X interms of Y is written as X =

Q11) If the demand and supply function are $= -3Q_d + 25$ and $P = 2Q_s + 7$ find the equilibrium Point after imposing a fixed tax $= 3$ Jd

Q12) The Solution of $|2X+3| \leq 5$ is

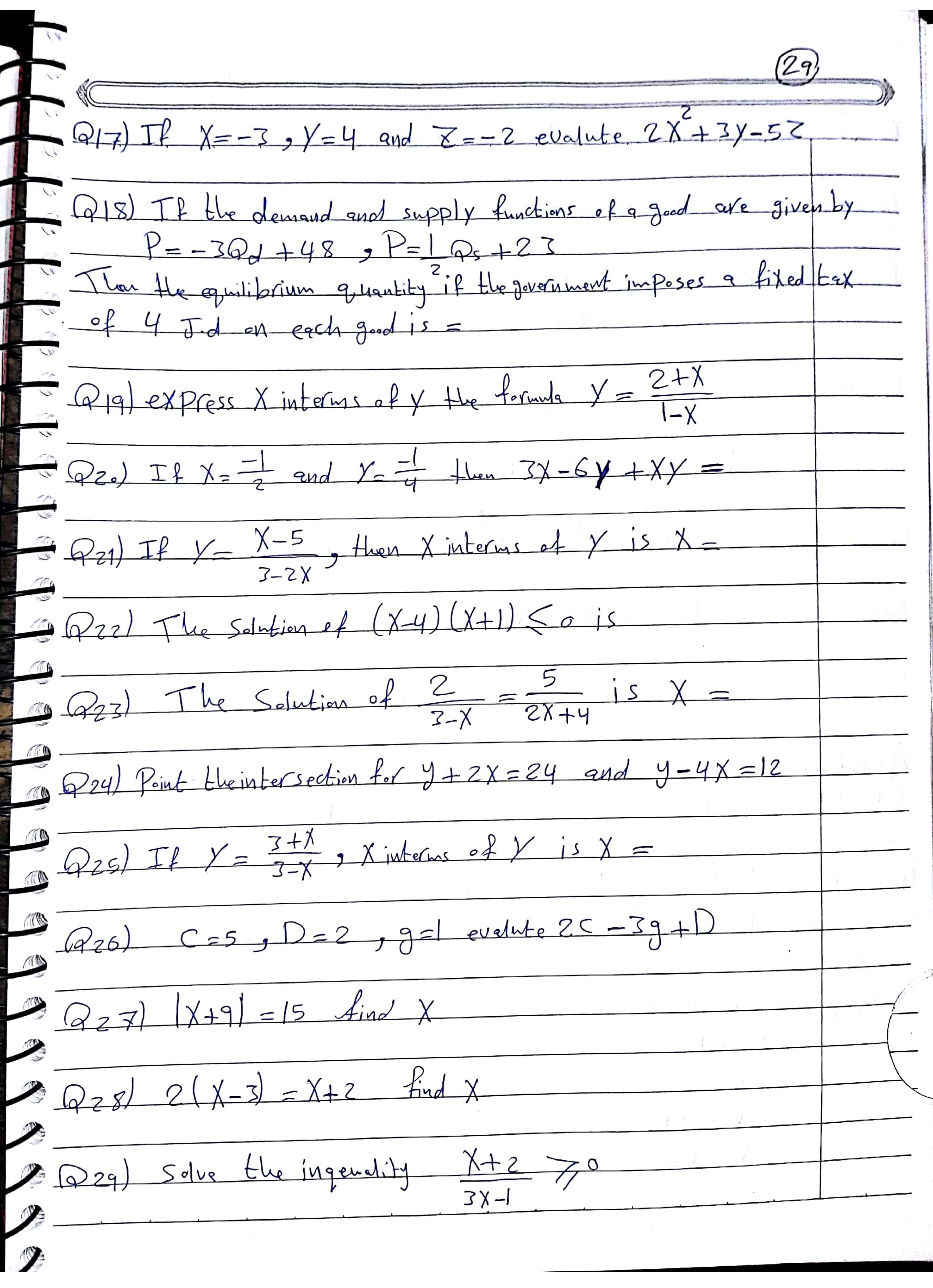
Q13) The Product of $(X-2)^2(X-1)$

Q14) The solution of $|2X-3| = 11$ is X =

Q15) If the equation $3X + 6 = 2(2X+2)$ and $-X + K = 2X - 1$ have the Same Solutions, Then the Value of K =

Q16) The equation of line that has Y-intercept 5 and Perbendicular to the line $4X + 2Y = 1$ is

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Q17) If $X = -3$, $Y = 4$ and $Z = -2$ evalute $2X^2 + 3Y - 5Z$

Q18) If the demand and supply functions of a good are given by

$P = -3Q_d + 48$, $P = \frac{1}{2} Q_s + 23$

Then the equilibrium quantity if the government imposes a fixed tax of 4 J.d on each good is =

Q19) express X interms of Y the formula $Y = \frac{2+X}{1-X}$

Q20) If $X = \frac{-1}{2}$ and $Y = \frac{-1}{4}$ then $3X - 6Y + XY =$

Q21) If $Y = \frac{X-5}{3-2X}$, then X interms of Y is $X =$

Q22) The Solution of $(X-4)(X+1) \leq 0$ is

Q23) The Solution of $\frac{2}{3-X} = \frac{5}{2X+4}$ is $X =$

Q24) Point theintersection for $y + 2X = 24$ and $y - 4X = 12$

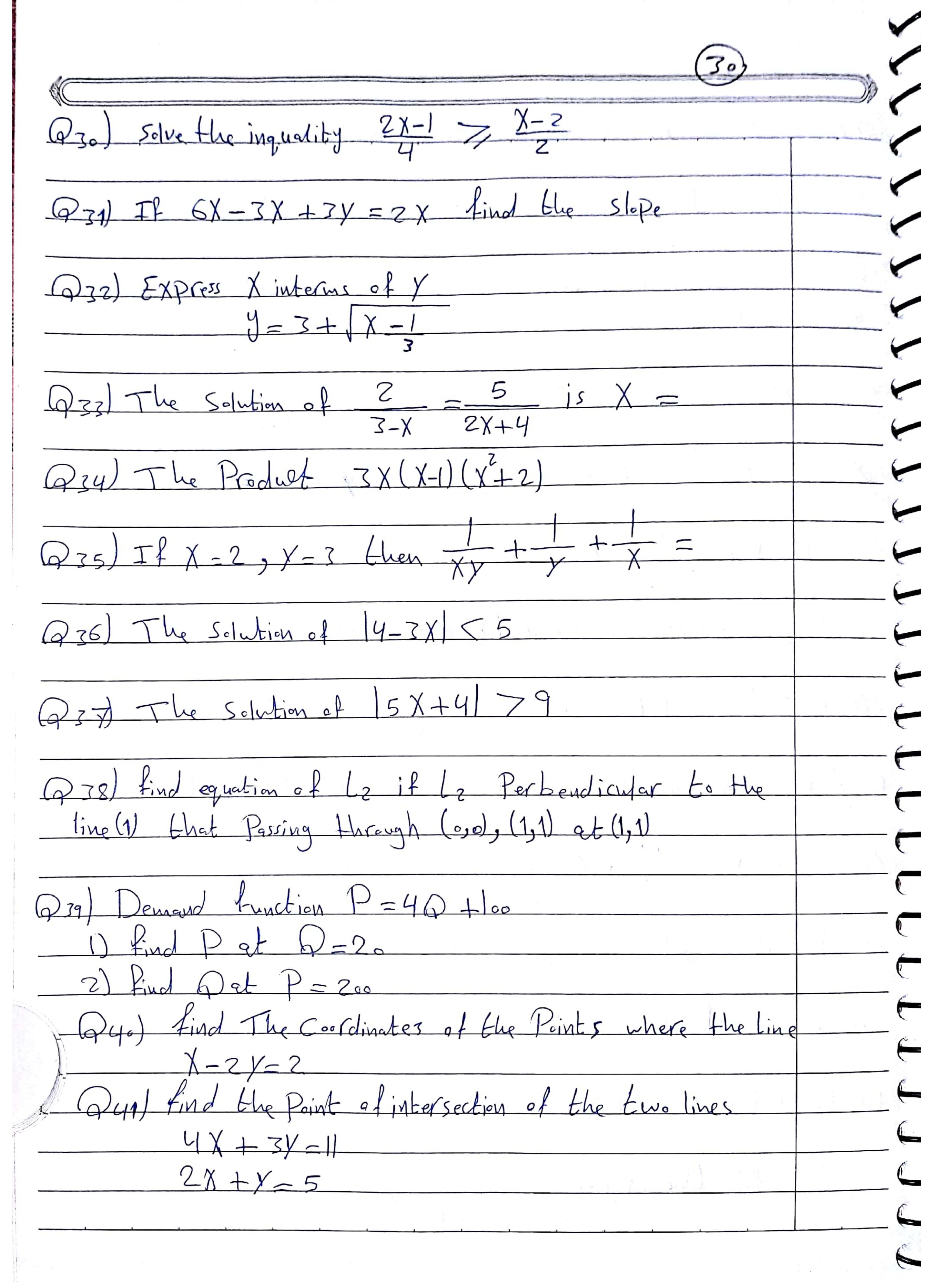
Q25) If $Y = \frac{3+X}{3-X}$, X interms of Y is $X =$

Q26) $C = 5$, $D = 2$, $g = 1$ evalute $2C - 3g + D$

Q27) $|X+9| = 15$ find X

Q28) $2(X-3) = X+2$ find X

Q29) Solve the ineqenality $\frac{X+2}{3X-1} \geq 0$



Q30) Solve the inequality $\frac{2X-1}{4} \geq \frac{X-2}{2}$

Q31) If $6X-3X+3Y=2X$ find the slope

Q32) Express X interms of Y
$y=3+\sqrt{X-\frac{1}{3}}$

Q33) The Solution of $\frac{2}{3-X}=\frac{5}{2X+4}$ is $X=$

Q34) The Product $3X(X-1)(X^2+2)$

Q35) If $X=2, Y=3$ then $\frac{1}{XY}+\frac{1}{Y}+\frac{1}{X}=$

Q36) The Solution of $|4-3X|<5$

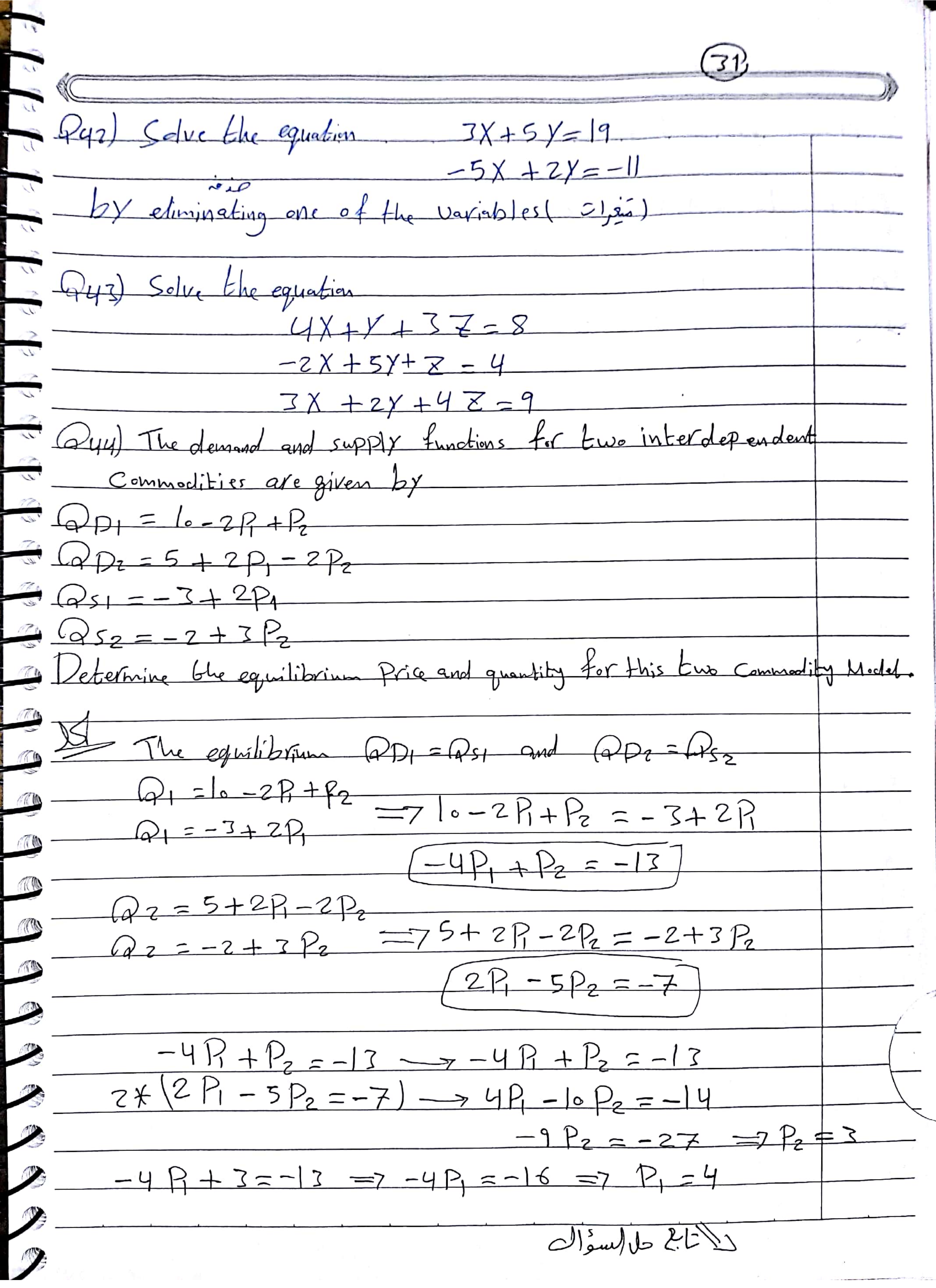
Q37) The Solution of $|5X+4|>9$

Q38) find equation of L_2 if L_2 Perpendicular to the line (1) that Passing through (0,0), (1,1) at (1,1)

Q39) Demand function $P=4Q+100$
1) find P at $Q=20$
2) find Q at $P=200$

Q40) find The Coordinates of the Points where the line
$X-2Y=2$

Q41) find the Point of intersection of the two lines
$4X+3Y=11$
$2X+Y=5$



Q42) Solve the equation $3X + 5Y = 19$
$-5X + 2Y = -11$

by eliminating (حذف) one of the variables(متغيرات)

Q43) Solve the equation

$$4X + Y + 3Z = 8$$
$$-2X + 5Y + Z = 4$$
$$3X + 2Y + 4Z = 9$$

Q44) The demand and supply functions for two interdependent commodities are given by

$Q_{D1} = 10 - 2P_1 + P_2$

$Q_{D2} = 5 + 2P_1 - 2P_2$

$Q_{S1} = -3 + 2P_1$

$Q_{S2} = -2 + 3P_2$

Determine the equilibrium Price and quantity for this two commodity Model.

Sol

The equilibrium $Q_{D1} = Q_{S1}$ and $Q_{D2} = Q_{S2}$

$Q_1 = 10 - 2P_1 + P_2$
$Q_1 = -3 + 2P_1$ $\Rightarrow 10 - 2P_1 + P_2 = -3 + 2P_1$

$$\boxed{-4P_1 + P_2 = -13}$$

$Q_2 = 5 + 2P_1 - 2P_2$
$Q_2 = -2 + 3P_2$ $\Rightarrow 5 + 2P_1 - 2P_2 = -2 + 3P_2$

$$\boxed{2P_1 - 5P_2 = -7}$$

$-4P_1 + P_2 = -13 \longrightarrow -4P_1 + P_2 = -13$

$2 * (2P_1 - 5P_2 = -7) \longrightarrow 4P_1 - 10P_2 = -14$

$-9P_2 = -27 \Rightarrow P_2 = 3$

$-4P_1 + 3 = -13 \Rightarrow -4P_1 = -16 \Rightarrow P_1 = 4$

تابع حل السؤال ⟸

(32)

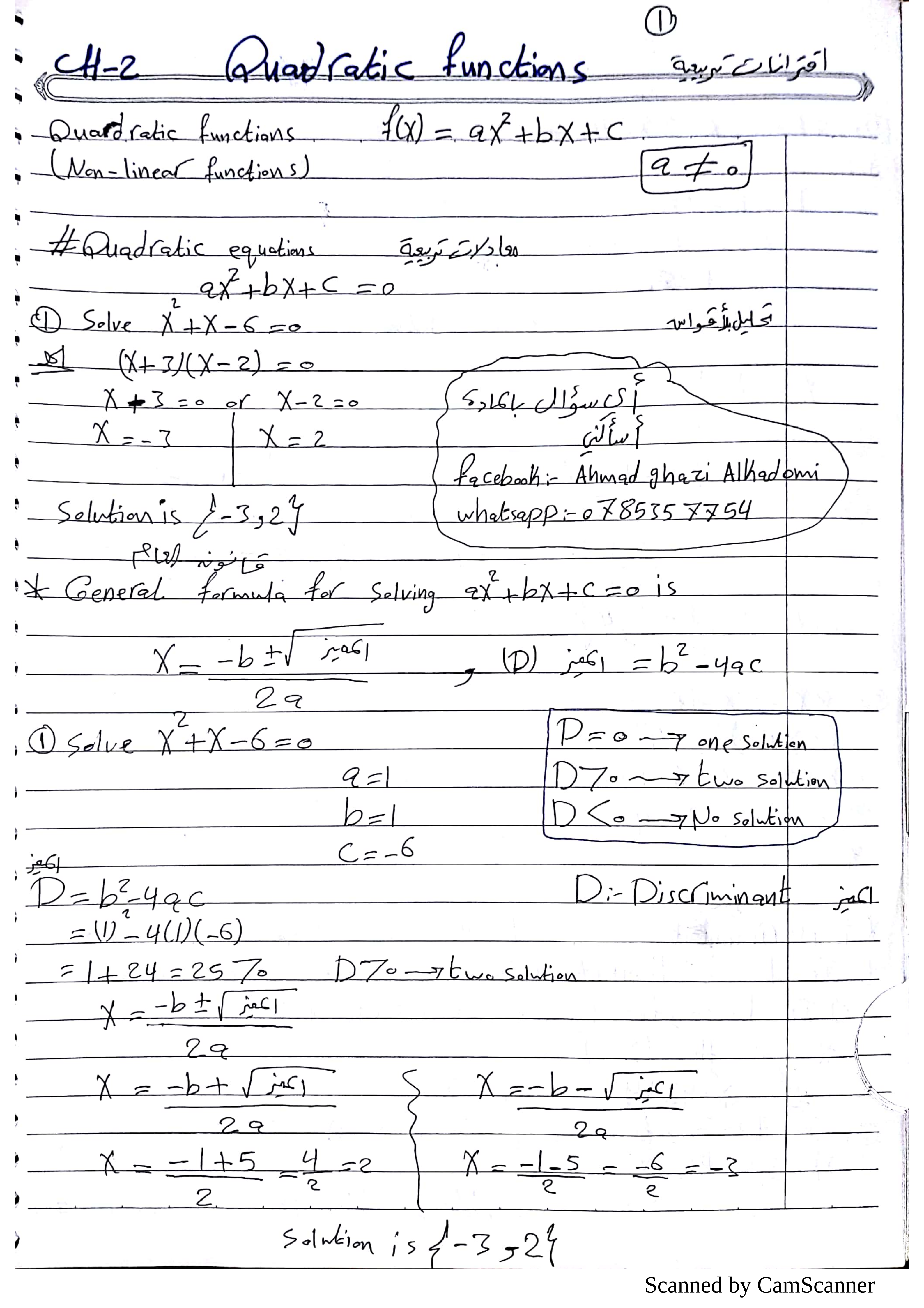
$P_1 = 4$, $P_2 = 3$

$Q_{D1} = 10 - 2(4) + 3 = 5$ ✓

$Q_{D2} = 5 + 2(4) - 2(3) = 7$ ✓

$Q_{S1} = -3 + 2(4) = 5$ ✓

$Q_{S2} = -2 + 3(3) = 7$ ✓



CH-2 Quadratic functions اقترانات تربيعية

Quadratic functions $f(x) = ax^2 + bx + c$

(Non-linear functions) $a \neq 0$

Quadratic equations معادلات تربيعية

$$ax^2 + bx + c = 0$$

① Solve $x^2 + x - 6 = 0$ تحليل بالأقواس

Sol: $(x+3)(x-2) = 0$

$x + 3 = 0$ or $x - 2 = 0$

$x = -3$ | $x = 2$

Solution is $\{-3, 2\}$

أي سؤال بالمادة أسألني
facebook:- Ahmad ghazi Alkhadomi
whatsapp:- 0785357754

قانون العام

* General formula for solving $ax^2 + bx + c = 0$ is

$$x = \frac{-b \pm \sqrt{\text{المميز}}}{2a}, \quad (D) \text{ المميز } = b^2 - 4ac$$

① Solve $x^2 + x - 6 = 0$

$D = 0 \rightarrow$ one solution
$D > 0 \rightarrow$ two solution
$D < 0 \rightarrow$ No solution

$a = 1$
$b = 1$
$c = -6$

المميز

$D = b^2 - 4ac$ D:- Discriminant المميز

$= (1)^2 - 4(1)(-6)$

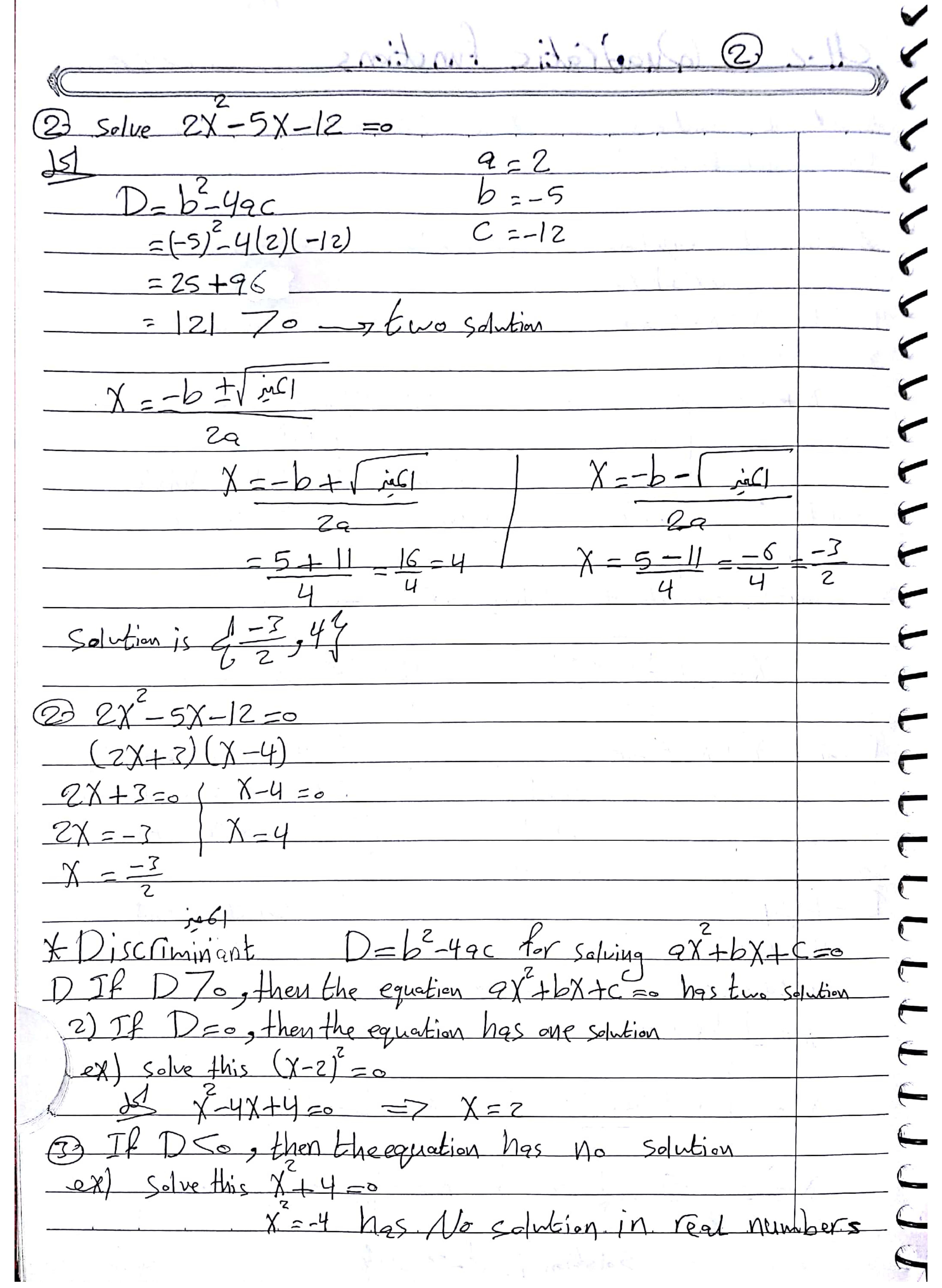
$= 1 + 24 = 25 > 0$ $D > 0 \rightarrow$ two solution

$$x = \frac{-b \pm \sqrt{\text{المميز}}}{2a}$$

$$x = \frac{-b + \sqrt{\text{المميز}}}{2a} \qquad x = \frac{-b - \sqrt{\text{المميز}}}{2a}$$

$$x = \frac{-1+5}{2} = \frac{4}{2} = 2 \qquad x = \frac{-1-5}{2} = \frac{-6}{2} = -3$$

Solution is $\{-3, 2\}$



(2) Solve $2x^2-5x-12=0$

الحل

$a=2$, $b=-5$, $c=-12$

$$D=b^2-4ac$$
$$=(-5)^2-4(2)(-12)$$
$$=25+96$$
$$=121>0 \rightarrow \text{two solution}$$

$$x=\frac{-b\pm\sqrt{\text{المميز}}}{2a}$$

$$x=\frac{-b+\sqrt{\text{المميز}}}{2a}=\frac{5+11}{4}=\frac{16}{4}=4$$

$$x=\frac{-b-\sqrt{\text{المميز}}}{2a} \qquad x=\frac{5-11}{4}=\frac{-6}{4}=\frac{-3}{2}$$

Solution is $\left\{\frac{-3}{2}, 4\right\}$

(2) $2x^2-5x-12=0$

$(2x+3)(x-4)$

$2x+3=0$	$x-4=0$
$2x=-3$	$x=4$
$x=\frac{-3}{2}$	

المميز

* Discriminant $D=b^2-4ac$ for solving $ax^2+bx+c=0$

1) If $D>0$, then the equation $ax^2+bx+c=0$ has two solution

2) If $D=0$, then the equation has one solution

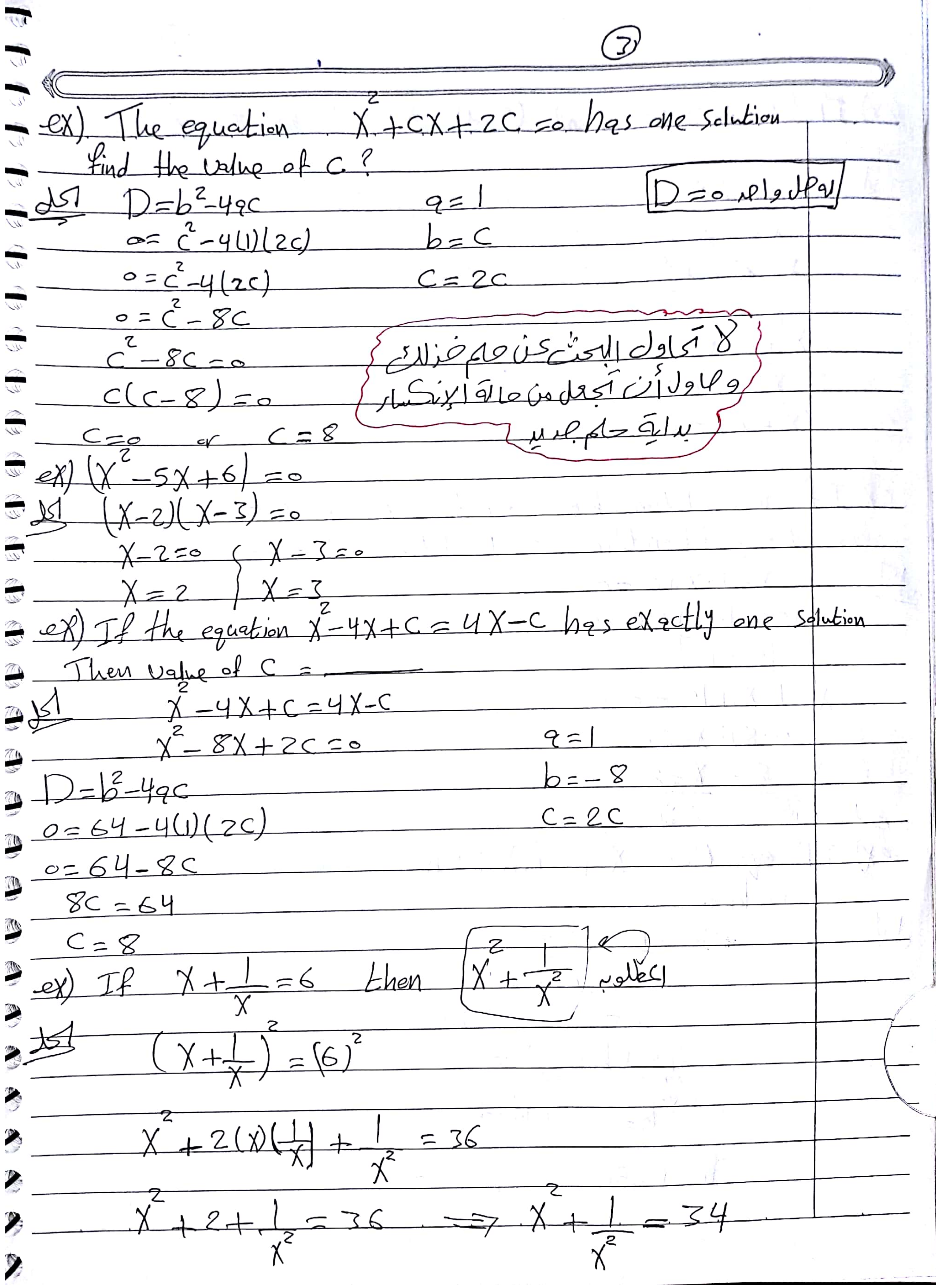
ex) solve this $(x-2)^2=0$

الحل $x^2-4x+4=0 \Rightarrow x=2$

3) If $D<0$, then the equation has no solution

ex) Solve this $x^2+4=0$

$x^2=-4$ has No solution in real numbers



ex) The equation $x^2 + cx + 2c = 0$ has one solution, find the value of c?

لها حل واحد $D = 0$

الحل

$D = b^2 - 4ac$ $\qquad a = 1$

$0 = c^2 - 4(1)(2c)$ $\qquad b = c$

$0 = c^2 - 4(2c)$ $\qquad c = 2c$

$0 = c^2 - 8c$

$c^2 - 8c = 0$

$c(c-8) = 0$

$c = 0$ or $c = 8$

لا تحاول البحث عن حلم خذلك
وحاول أن تجعل من حالة الانكسار
بداية حلم جديد

ex) $(x^2 - 5x + 6) = 0$

الحل $(x-2)(x-3) = 0$

$x - 2 = 0$ | $x - 3 = 0$

$x = 2$ | $x = 3$

ex) If the equation $x^2 - 4x + c = 4x - c$ has exactly one solution, Then value of c = ______

الحل

$x^2 - 4x + c = 4x - c$

$x^2 - 8x + 2c = 0$ $\qquad a = 1$

$D = b^2 - 4ac$ $\qquad b = -8$

$0 = 64 - 4(1)(2c)$ $\qquad c = 2c$

$0 = 64 - 8c$

$8c = 64$

$c = 8$

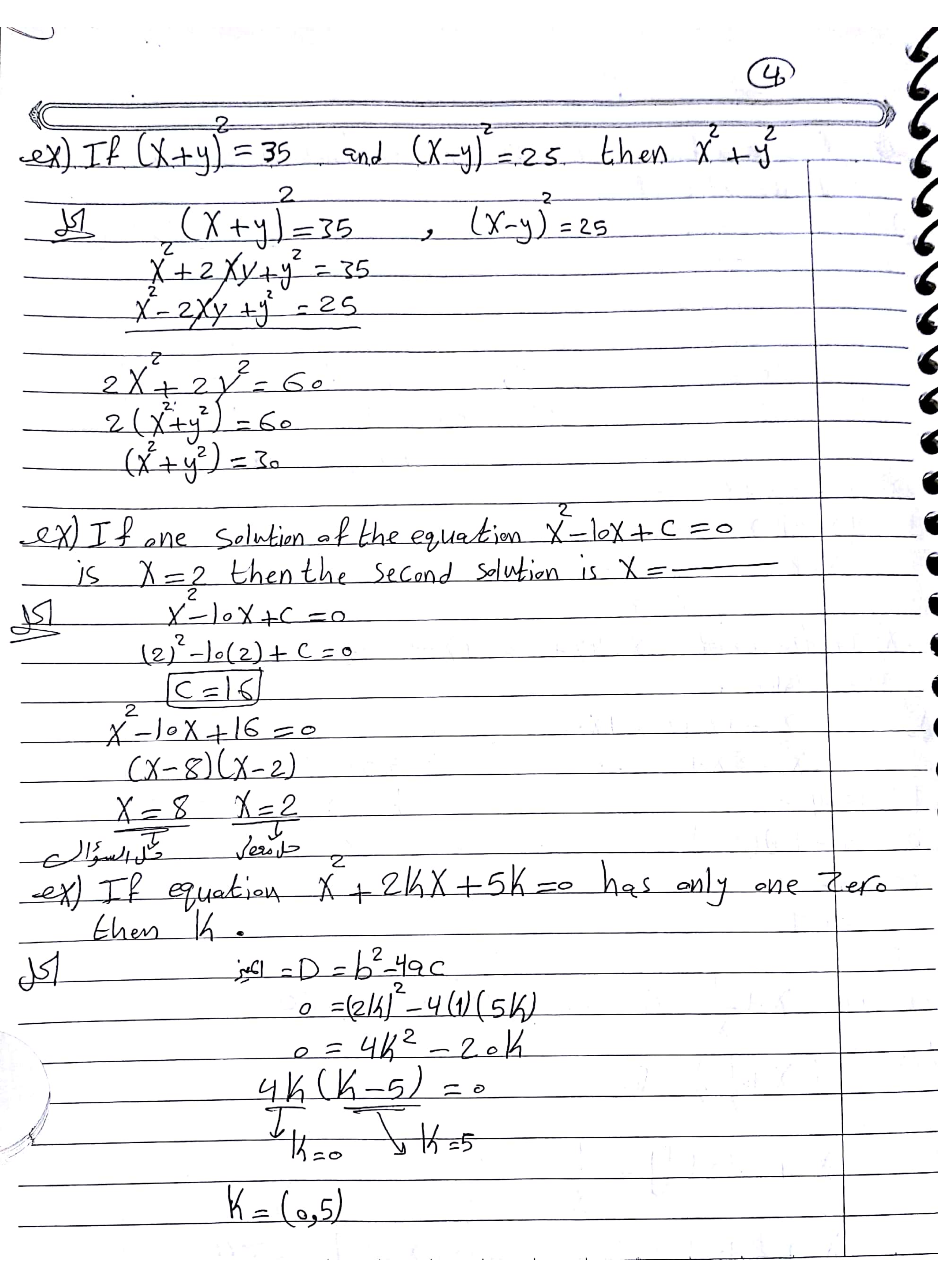
ex) If $x + \frac{1}{x} = 6$ then $x^2 + \frac{1}{x^2}$ المطلوب

الحل

$\left(x + \frac{1}{x}\right)^2 = (6)^2$

$x^2 + 2(x)\left(\frac{1}{x}\right) + \frac{1}{x^2} = 36$

$x^2 + 2 + \frac{1}{x^2} = 36 \Rightarrow x^2 + \frac{1}{x^2} = 34$



ex) If $(X+y)^2 = 35$ and $(X-y)^2 = 25$ then $X^2 + y^2$

الحل

$$(X+y)^2 = 35 \quad , \quad (X-y)^2 = 25$$

$$X^2 + 2Xy + y^2 = 35$$
$$X^2 - 2Xy + y^2 = 25$$

$$2X^2 + 2y^2 = 60$$
$$2(X^2 + y^2) = 60$$
$$(X^2 + y^2) = 30$$

ex) If one solution of the equation $X^2 - 10X + C = 0$ is $X = 2$ then the second solution is $X =$ ____

الحل

$$X^2 - 10X + C = 0$$
$$(2)^2 - 10(2) + C = 0$$
$$\boxed{C = 16}$$
$$X^2 - 10X + 16 = 0$$
$$(X-8)(X-2)$$
$$X = 8 \qquad X = 2$$

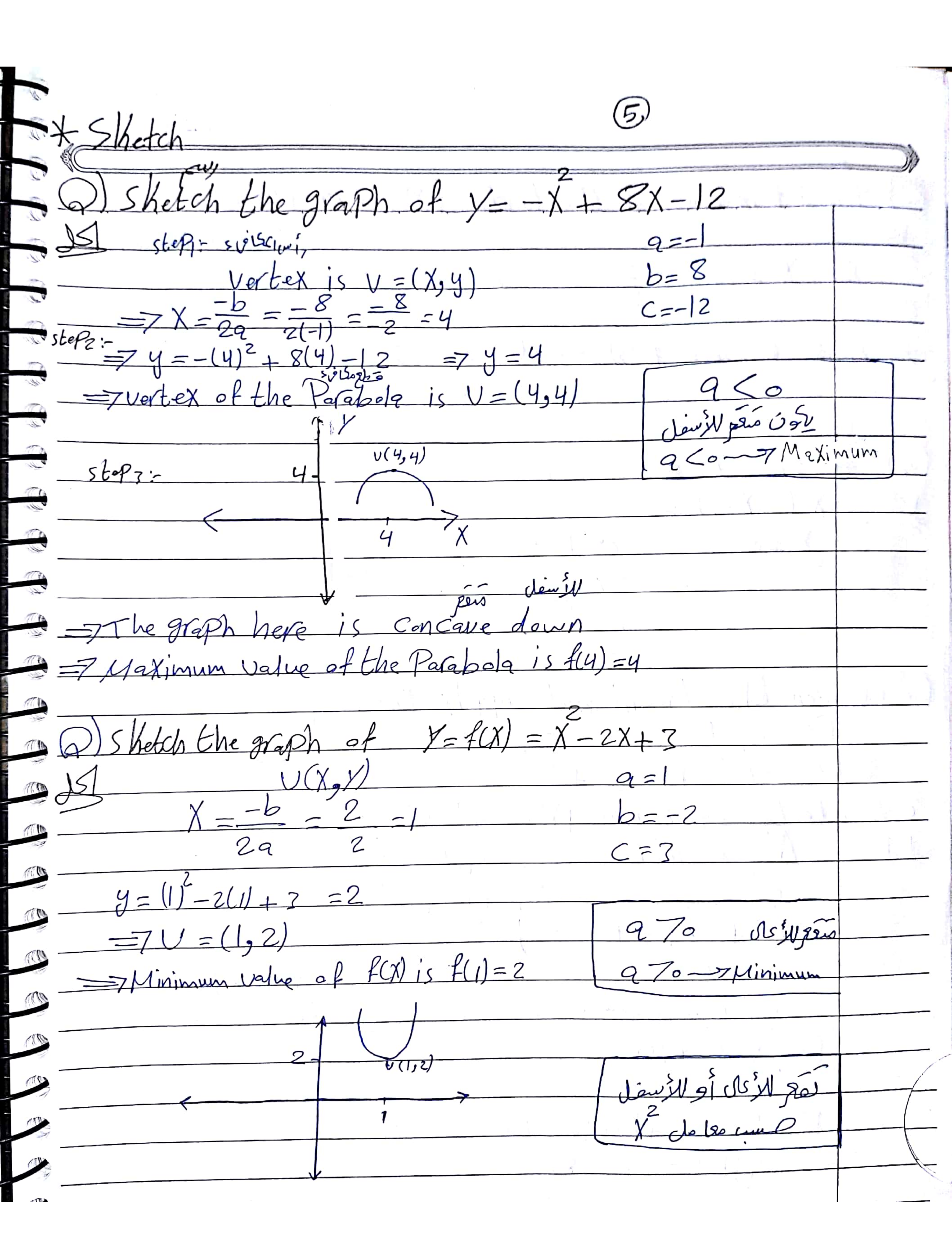
$X = 8$ → حل السؤال

$X = 2$ → حل معلوم

ex) If equation $X^2 + 2kX + 5k = 0$ has only one zero then k.

الحل

$$\text{المميز} = D = b^2 - 4ac$$
$$0 = (2k)^2 - 4(1)(5k)$$
$$0 = 4k^2 - 20k$$
$$4k(k-5) = 0$$
$$k = 0 \qquad k = 5$$
$$k = (0, 5)$$



* Sketch

Q) Sketch (رسم) the graph of $y = -x^2 + 8x - 12$

الحل

step1: إيجاد الرأس

$a = -1$

$b = 8$

$c = -12$

vertex is $V = (x, y)$

$\Rightarrow x = \frac{-b}{2a} = \frac{-8}{2(-1)} = \frac{-8}{-2} = 4$

step2:- $\Rightarrow y = -(4)^2 + 8(4) - 12 \Rightarrow y = 4$

$\Rightarrow$ vertex of the Parabola (قطع مكافئ) is $V = (4, 4)$

$a < 0$
يكون مقعر للأسفل
$a < 0 \longrightarrow$ Maximum

step3:-

$\Rightarrow$ The graph here is concave (مقعر) down (للأسفل)

$\Rightarrow$ Maximum value of the Parabola is $f(4) = 4$

Q) Sketch the graph of $y = f(x) = x^2 - 2x + 3$

الحل

$V(x, y)$

$a = 1$

$b = -2$

$c = 3$

$x = \frac{-b}{2a} = \frac{2}{2} = 1$

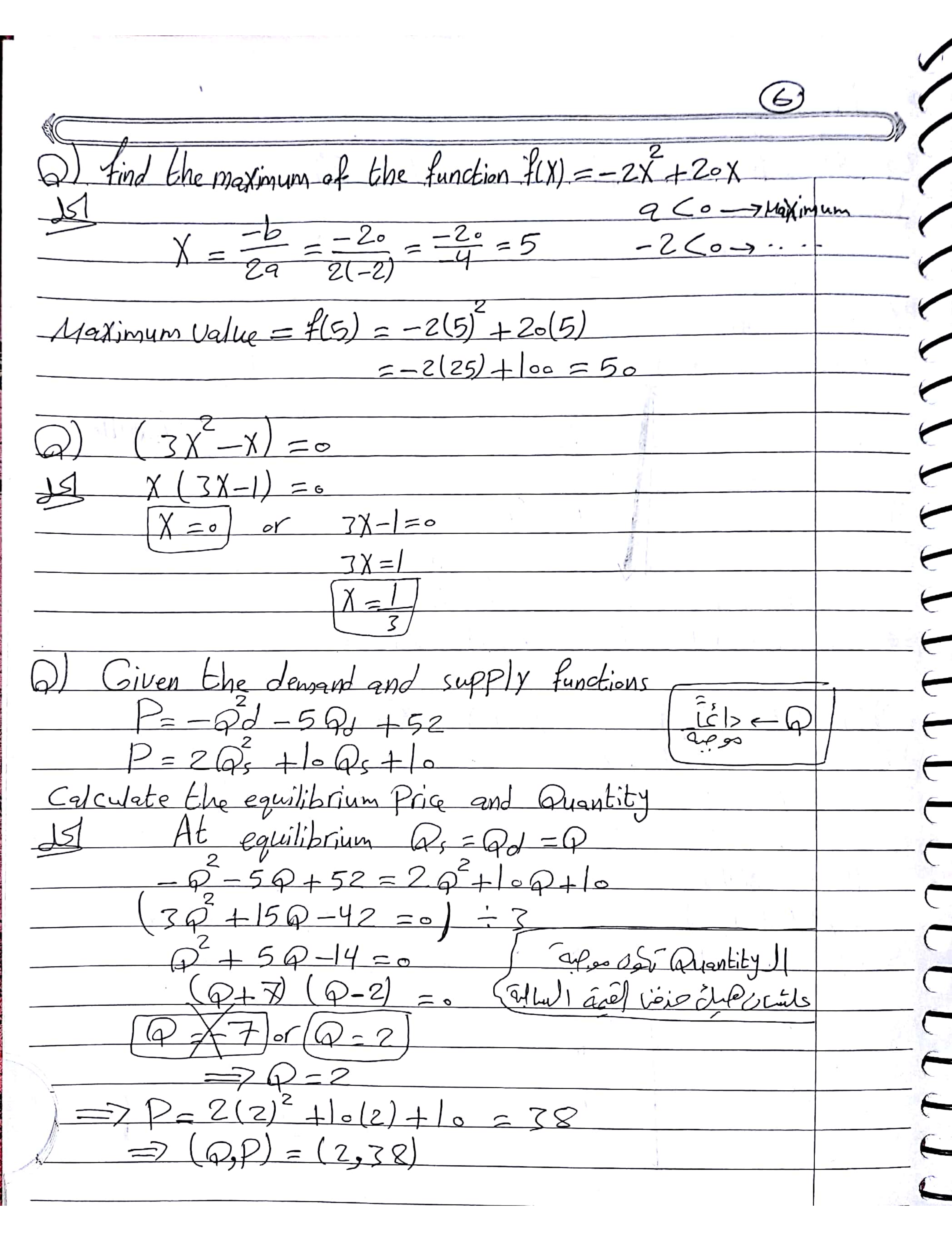
$y = (1)^2 - 2(1) + 3 = 2$

$\Rightarrow V = (1, 2)$

$\Rightarrow$ Minimum value of $f(x)$ is $f(1) = 2$

$a > 0$ مقعر للأعلى
$a > 0 \longrightarrow$ Minimum

تقعر للأعلى أو للأسفل
حسب معامل x^2



6

Q) find the maximum of the function $f(X) = -2X^2 + 20X$

الحل

$a < 0 \rightarrow$ Maximum

$-2 < 0 \rightarrow \dots$

$$X = \frac{-b}{2a} = \frac{-20}{2(-2)} = \frac{-20}{-4} = 5$$

$$\text{Maximum Value} = f(5) = -2(5)^2 + 20(5)$$
$$= -2(25) + 100 = 50$$

Q) $(3X^2 - X) = 0$

الحل

$X(3X - 1) = 0$

$\boxed{X = 0}$ or $3X - 1 = 0$

$3X = 1$

$\boxed{X = \frac{1}{3}}$

Q) Given the demand and supply functions

$P = -Q_d^2 - 5Q_d + 52$

$P = 2Q_s^2 + 10Q_s + 10$

Q ← دائماً موجبة

Calculate the equilibrium Price and Quantity

الحل

At equilibrium $Q_s = Q_d = Q$

$-Q^2 - 5Q + 52 = 2Q^2 + 10Q + 10$

$(3Q^2 + 15Q - 42 = 0) \div 3$

$Q^2 + 5Q - 14 = 0$

$(Q + 7)(Q - 2) = 0$

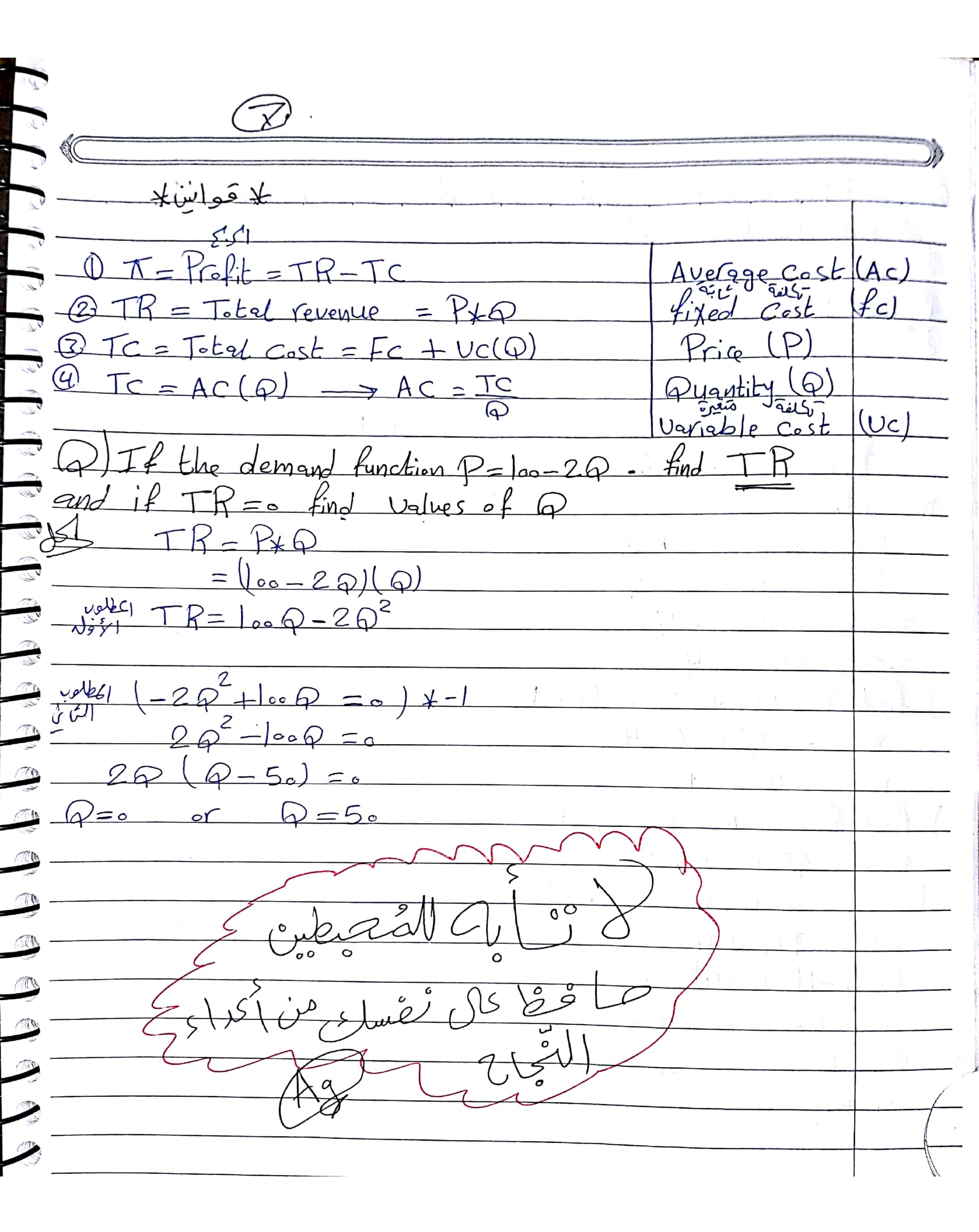
الـ Quantity تكون موجبة
علشان هيك حذفنا القيمة السالبة

$\boxed{Q = -7}$ (crossed out) or $\boxed{Q = 2}$

$\Rightarrow Q = 2$

$\Rightarrow P = 2(2)^2 + 10(2) + 10 = 38$

$\Rightarrow (Q, P) = (2, 38)$



(7)

*** قوانين ***

1. $\pi = \text{Profit} = TR - TC$ (الربح)
2. $TR = \text{Total revenue} = P * Q$
3. $TC = \text{Total cost} = FC + VC(Q)$
4. $TC = AC(Q) \longrightarrow AC = \frac{TC}{Q}$

Average Cost	(AC)
Fixed Cost تكلفة ثابتة	(FC)
Price (P)	
Quantity (Q)	
Variable Cost تكلفة متغيرة	(VC)

Q) If the demand function $P = 100 - 2Q$. find TR and if $TR = 0$ find values of Q

الحل

$TR = P * Q$

$= (100 - 2Q)(Q)$

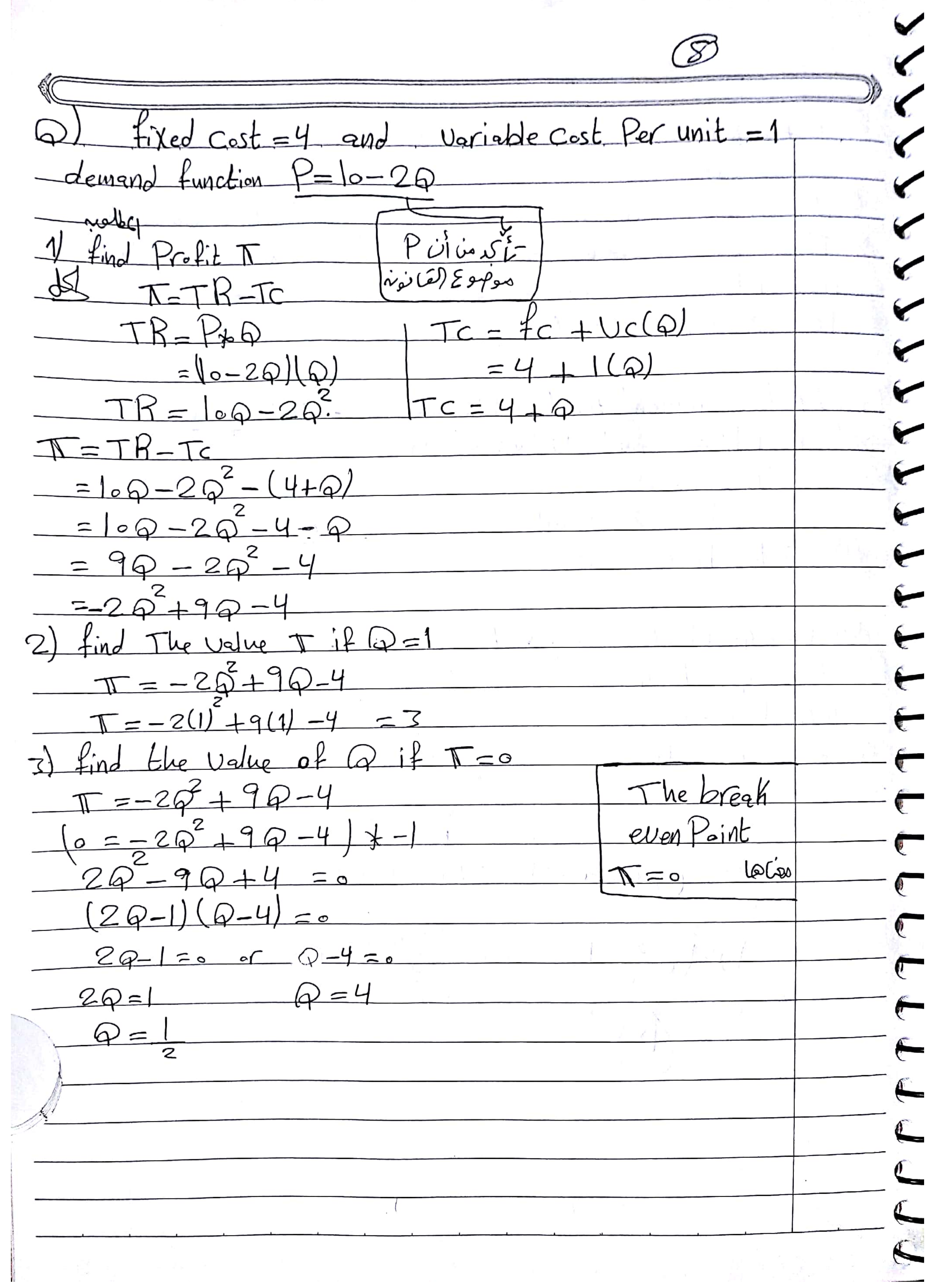
المطلوب الأول $TR = 100Q - 2Q^2$

المطلوب الثاني $(-2Q^2 + 100Q = 0) * -1$

$2Q^2 - 100Q = 0$

$2Q(Q - 50) = 0$

$Q = 0$ or $Q = 50$



Q) fixed cost $= 4$ and variable cost per unit $= 1$

demand function $P = 10 - 2Q$

> تأكد من أن P موضوع القانون

مطلوب

1) find Profit π

الحل

$$\pi = TR - TC$$

$$TR = P * Q$$
$$= (10 - 2Q)(Q)$$
$$TR = 10Q - 2Q^2$$

$$TC = FC + VC(Q)$$
$$= 4 + 1(Q)$$
$$TC = 4 + Q$$

$$\pi = TR - TC$$
$$= 10Q - 2Q^2 - (4 + Q)$$
$$= 10Q - 2Q^2 - 4 - Q$$
$$= 9Q - 2Q^2 - 4$$
$$= -2Q^2 + 9Q - 4$$

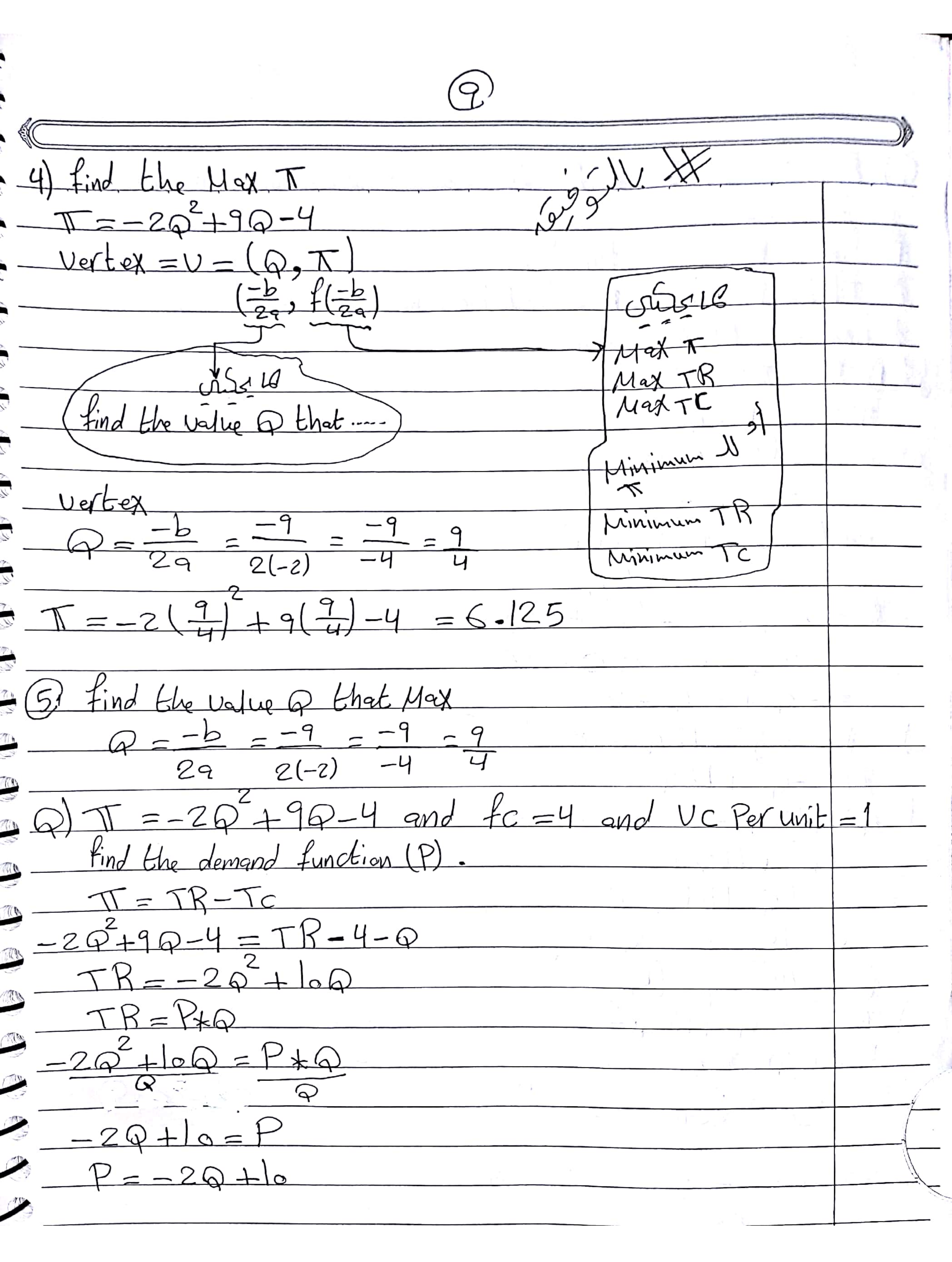
2) find the value π if $Q = 1$

$$\pi = -2Q^2 + 9Q - 4$$
$$\pi = -2(1)^2 + 9(1) - 4 = 3$$

3) find the value of Q if $\pi = 0$

> The break even point
> $\pi = 0$ معناها

$$\pi = -2Q^2 + 9Q - 4$$
$$(0 = -2Q^2 + 9Q - 4) * -1$$
$$2Q^2 - 9Q + 4 = 0$$
$$(2Q - 1)(Q - 4) = 0$$
$$2Q - 1 = 0 \quad \text{or} \quad Q - 4 = 0$$
$$2Q = 1 \qquad Q = 4$$
$$Q = \frac{1}{2}$$



4) find the Max π

$\pi = -2Q^2 + 9Q - 4$

vertex $= V = (Q, \pi)$

$\left(\frac{-b}{2a}, f\left(\frac{-b}{2a}\right)\right)$

كلها تعني — find the value Q that .....

كلها تعني:
- Max π
- Max TR
- Max TC

أو الـ Minimum:
- Minimum π
- Minimum TR
- Minimum TC

بالتوفيق

vertex

$Q = \frac{-b}{2a} = \frac{-9}{2(-2)} = \frac{-9}{-4} = \frac{9}{4}$

$\pi = -2\left(\frac{9}{4}\right)^2 + 9\left(\frac{9}{4}\right) - 4 = 6.125$

(5) find the value Q that Max

$Q = \frac{-b}{2a} = \frac{-9}{2(-2)} = \frac{-9}{-4} = \frac{9}{4}$

Q) $\pi = -2Q^2 + 9Q - 4$ and $fc = 4$ and VC Per unit $= 1$
find the demand function (P).

$\pi = TR - Tc$

$-2Q^2 + 9Q - 4 = TR - 4 - Q$

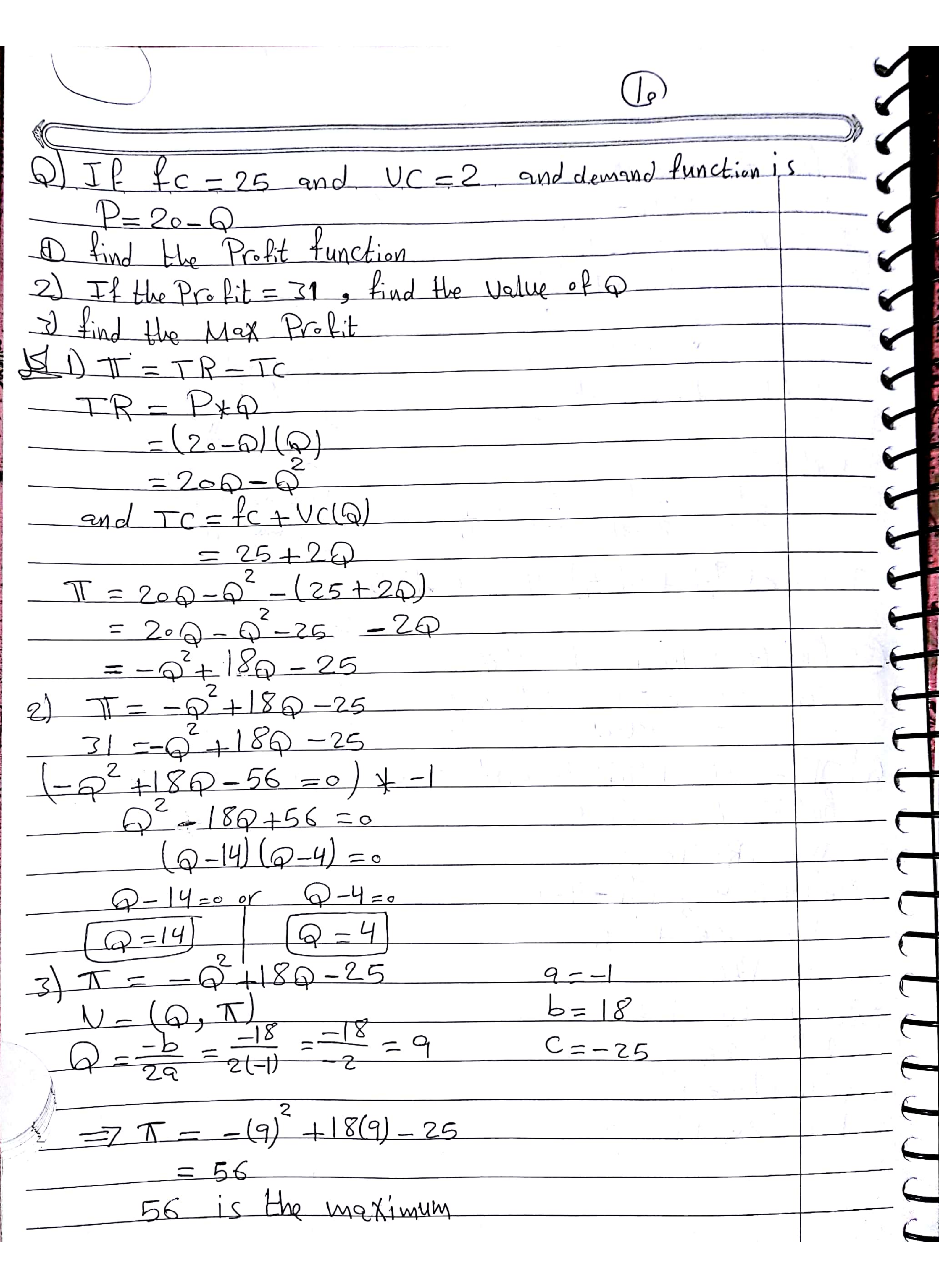
$TR = -2Q^2 + 10Q$

$TR = P * Q$

$\frac{-2Q^2 + 10Q}{Q} = \frac{P * Q}{Q}$

$-2Q + 10 = P$

$P = -2Q + 10$



Q) If $fc = 25$ and $VC = 2$ and demand function is $P = 20 - Q$

1) find the Profit function
2) If the Profit = 31, find the Value of Q
3) find the Max Profit

Sol 1) $\pi = TR - TC$

$TR = P * Q$

$= (20 - Q)(Q)$

$= 20Q - Q^2$

and $TC = fc + VC(Q)$

$= 25 + 2Q$

$\pi = 20Q - Q^2 - (25 + 2Q)$

$= 20Q - Q^2 - 25 - 2Q$

$= -Q^2 + 18Q - 25$

2) $\pi = -Q^2 + 18Q - 25$

$31 = -Q^2 + 18Q - 25$

$(-Q^2 + 18Q - 56 = 0) * -1$

$Q^2 - 18Q + 56 = 0$

$(Q - 14)(Q - 4) = 0$

$Q - 14 = 0$ or $Q - 4 = 0$

$\boxed{Q = 14}$ | $\boxed{Q = 4}$

3) $\pi = -Q^2 + 18Q - 25$

$a = -1$

$b = 18$

$c = -25$

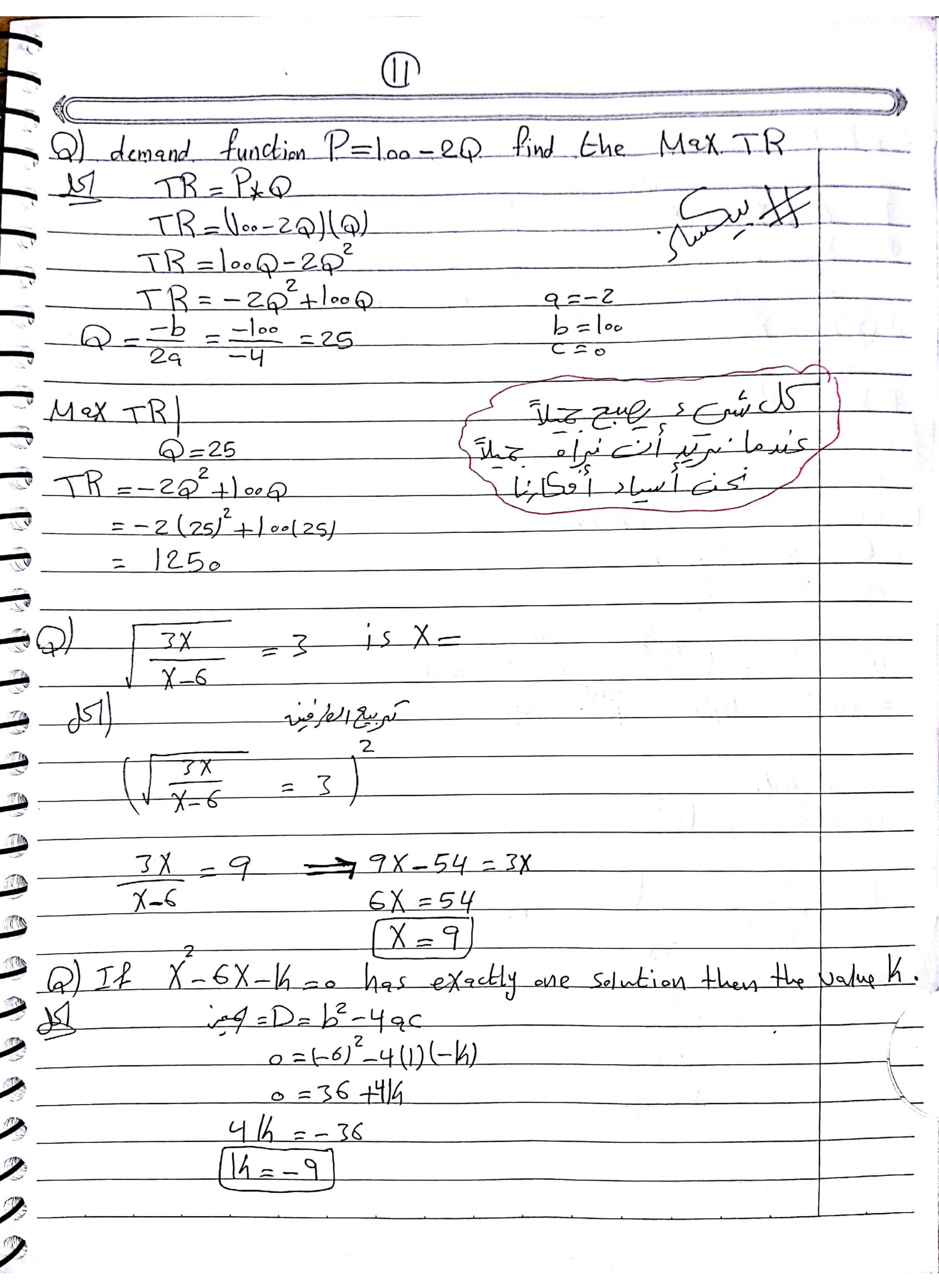
$V = (Q, \pi)$

$Q = \frac{-b}{2a} = \frac{-18}{2(-1)} = \frac{-18}{-2} = 9$

$\Rightarrow \pi = -(9)^2 + 18(9) - 25$

$= 56$

56 is the maximum



Q) demand function $P = 100 - 2Q$ find the Max TR

الحل

$TR = P * Q$

$TR = (100 - 2Q)(Q)$

$TR = 100Q - 2Q^2$

$TR = -2Q^2 + 100Q$

$a = -2$
$b = 100$
$c = 0$

$Q = \frac{-b}{2a} = \frac{-100}{-4} = 25$

Max TR | $Q = 25$

$TR = -2Q^2 + 100Q$

$= -2(25)^2 + 100(25)$

$= 1250$

كل شيء يصبح جميلاً
عندما نريد أن نراه جميلاً
نحن أسياد أفكارنا

Q) $\sqrt{\frac{3X}{X-6}} = 3$ is $X =$

الحل

تربيع الطرفين

$\left(\sqrt{\frac{3X}{X-6}} = 3\right)^2$

$\frac{3X}{X-6} = 9 \Longrightarrow 9X - 54 = 3X$

$6X = 54$

$\boxed{X = 9}$

Q) If $X^2 - 6X - k = 0$ has exactly one solution then the value k.

الحل

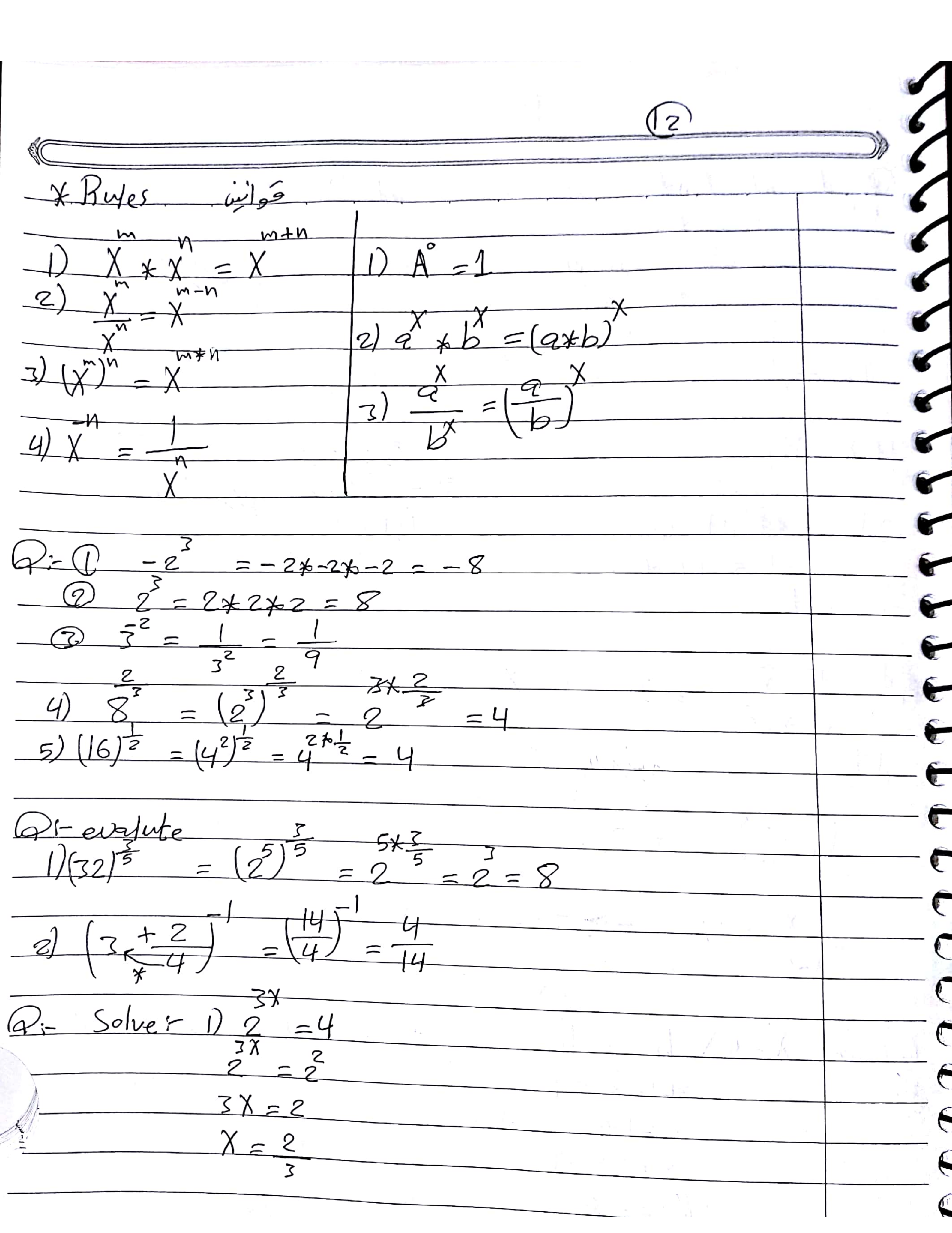
المميز $= D = b^2 - 4ac$

$0 = (-6)^2 - 4(1)(-k)$

$0 = 36 + 4k$

$4k = -36$

$\boxed{k = -9}$



* Rules قوانين

1) $X^m * X^n = X^{m+n}$
2) $\frac{X^m}{X^n} = X^{m-n}$
3) $(X^m)^n = X^{m*n}$
4) $X^{-n} = \frac{1}{X^n}$

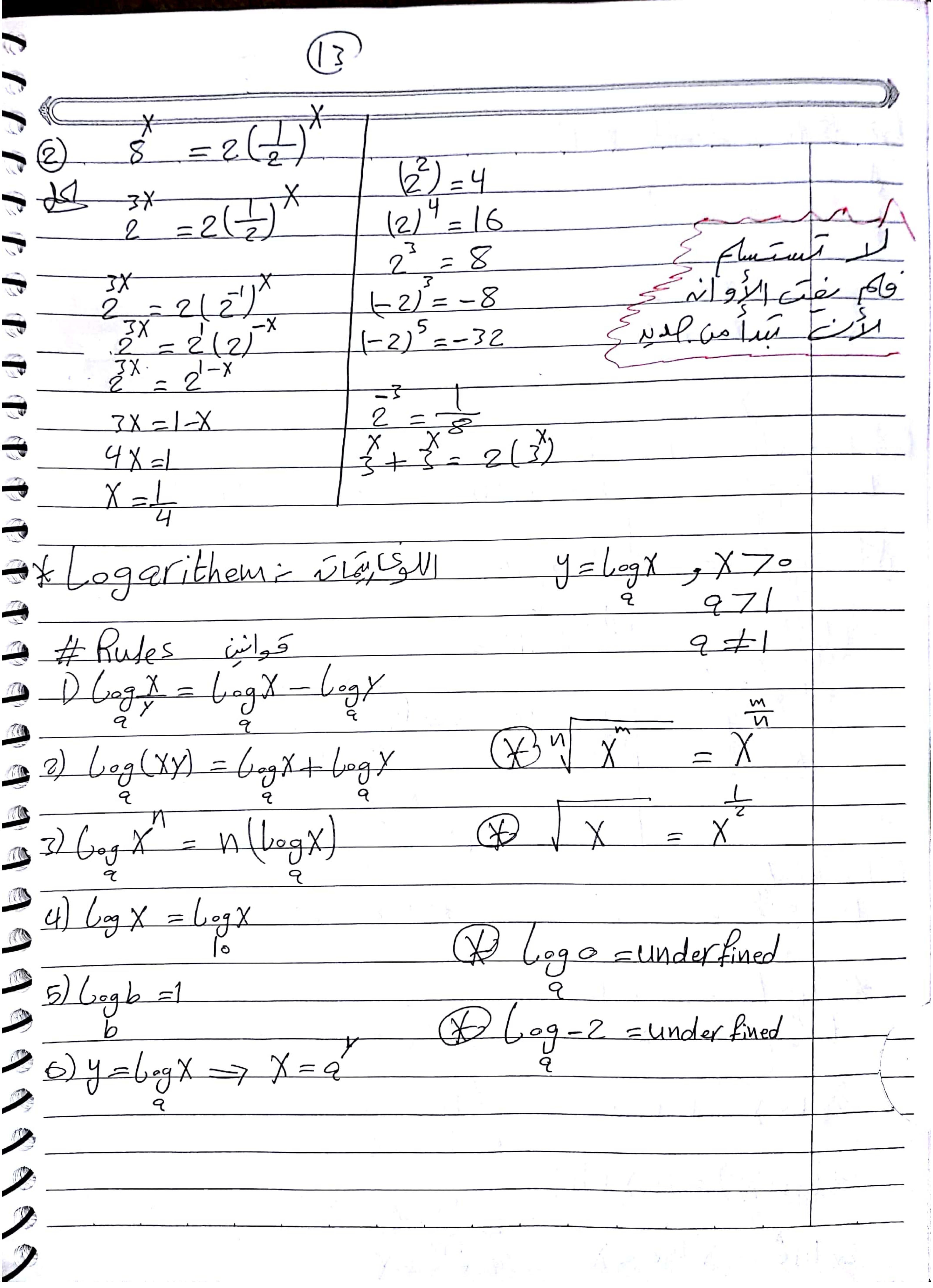
1) $A^0 = 1$
2) $a^X * b^X = (a*b)^X$
3) $\frac{a^X}{b^X} = \left(\frac{a}{b}\right)^X$

Q:- ① $-2^3 = -2*-2*-2 = -8$
② $2^3 = 2*2*2 = 8$
③ $3^{-2} = \frac{1}{3^2} = \frac{1}{9}$
4) $8^{\frac{2}{3}} = (2^3)^{\frac{2}{3}} = 2^{3*\frac{2}{3}} = 4$
5) $(16)^{\frac{1}{2}} = (4^2)^{\frac{1}{2}} = 4^{2*\frac{1}{2}} = 4$

Q:- evalute
1) $(32)^{\frac{3}{5}} = (2^5)^{\frac{3}{5}} = 2^{5*\frac{3}{5}} = 2^3 = 8$
2) $\left(3 + \frac{2}{4}\right)^{-1} = \left(\frac{14}{4}\right)^{-1} = \frac{4}{14}$

Q:- Solve:- 1) $2^{3X} = 4$
$2^{3X} = 2^2$
$3X = 2$
$X = \frac{2}{3}$

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② $8^{x} = 2\left(\frac{1}{2}\right)^{x}$

حل

$2^{3x} = 2\left(\frac{1}{2}\right)^{x}$

$2^{3x} = 2(2^{-1})^{x}$

$2^{3x} = 2^{1}(2)^{-x}$

$2^{3x} = 2^{1-x}$

$3x = 1 - x$

$4x = 1$

$x = \frac{1}{4}$

$(2^{2}) = 4$

$(2)^{4} = 16$

$2^{3} = 8$

$(-2)^{3} = -8$

$(-2)^{5} = -32$

$2^{-3} = \frac{1}{8}$

$3^{x} + 3^{x} = 2(3^{x})$

لا تستسلم
فلم يفت الأوان
الآن تبدأ من جديد

* Logarithem: اللوغاريتمات

$y = \log_a x \ , \ x > 0$

$a > 1$

$a \neq 1$

Rules قوانين

1) $\log_a \frac{x}{y} = \log_a x - \log_a y$

2) $\log_a (xy) = \log_a x + \log_a y$

3) $\log_a x^{n} = n(\log_a x)$

4) $\log x = \log_{10} x$

5) $\log_b b = 1$

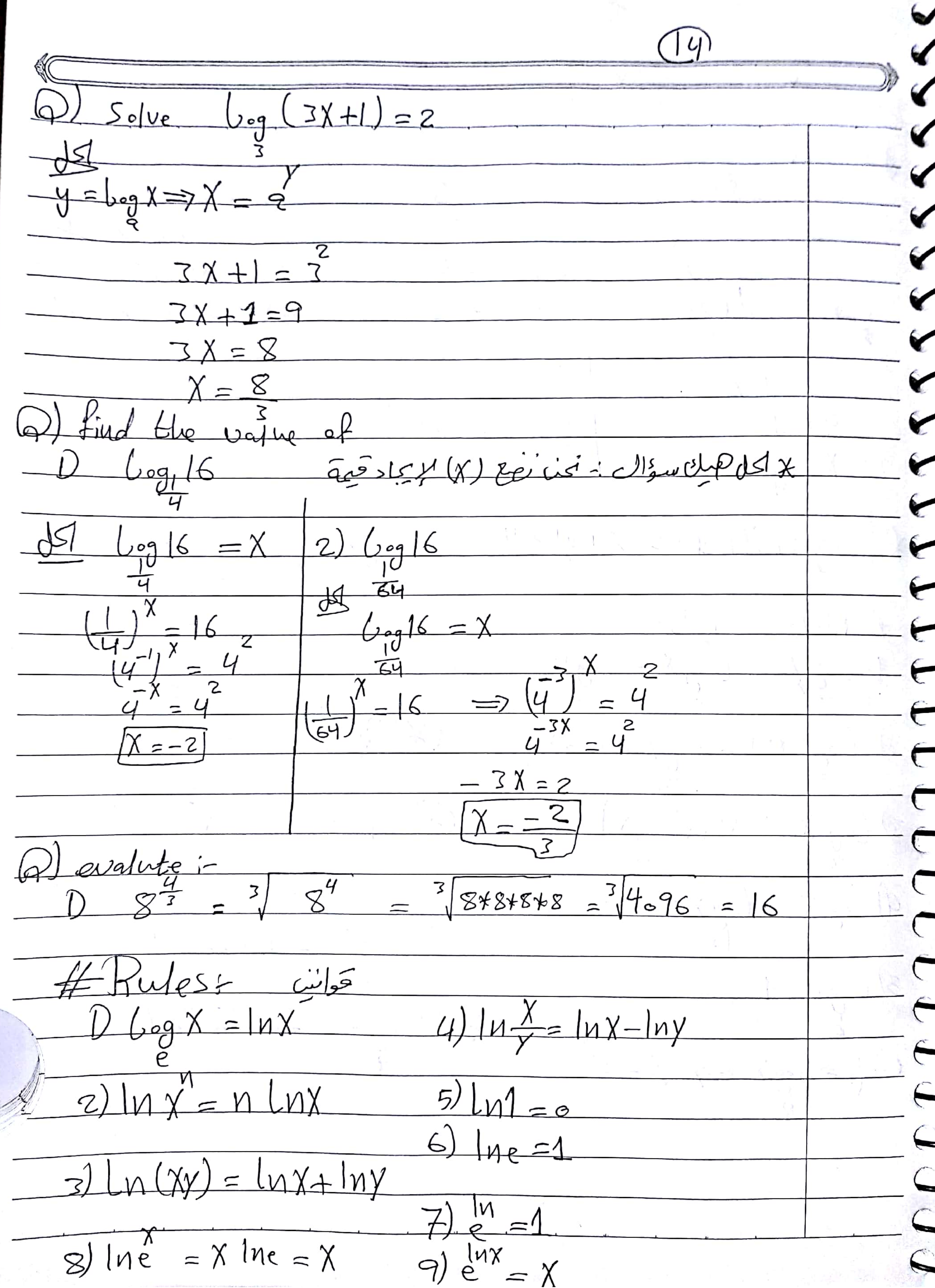
6) $y = \log_a x \Rightarrow x = a^{y}$

* $\sqrt[n]{x^{m}} = x^{\frac{m}{n}}$

* $\sqrt{x} = x^{\frac{1}{2}}$

* $\log_a 0 =$ underfined

* $\log_a -2 =$ underfined



Q) Solve $\log_3 (3X+1) = 2$

الحل

$y = \log_a X \Rightarrow X = a^y$

$3X + 1 = 3^2$

$3X + 1 = 9$

$3X = 8$

$X = \frac{8}{3}$

Q) find the value of

1) $\log_{\frac{1}{4}} 16$

* الحل هيك سؤال : نحن نضع (X) لإيجاد قيمة

الحل $\log_{\frac{1}{4}} 16 = X$

$\left(\frac{1}{4}\right)^X = 16$

$(4^{-1})^X = 4^2$

$4^{-X} = 4^2$

$X = -2$

2) $\log_{\frac{1}{64}} 16$

الحل $\log_{\frac{1}{64}} 16 = X$

$\left(\frac{1}{64}\right)^X = 16 \Rightarrow (4^{-3})^X = 4^2$

$4^{-3X} = 4^2$

$-3X = 2$

$X = \frac{-2}{3}$

Q) evalute :-

1) $8^{\frac{4}{3}} = \sqrt[3]{8^4} = \sqrt[3]{8*8*8*8} = \sqrt[3]{4096} = 16$

Rules :- قوانين

1) $\log_e X = \ln X$

2) $\ln X^n = n \ln X$

3) $\ln (XY) = \ln X + \ln Y$

4) $\ln \frac{X}{Y} = \ln X - \ln Y$

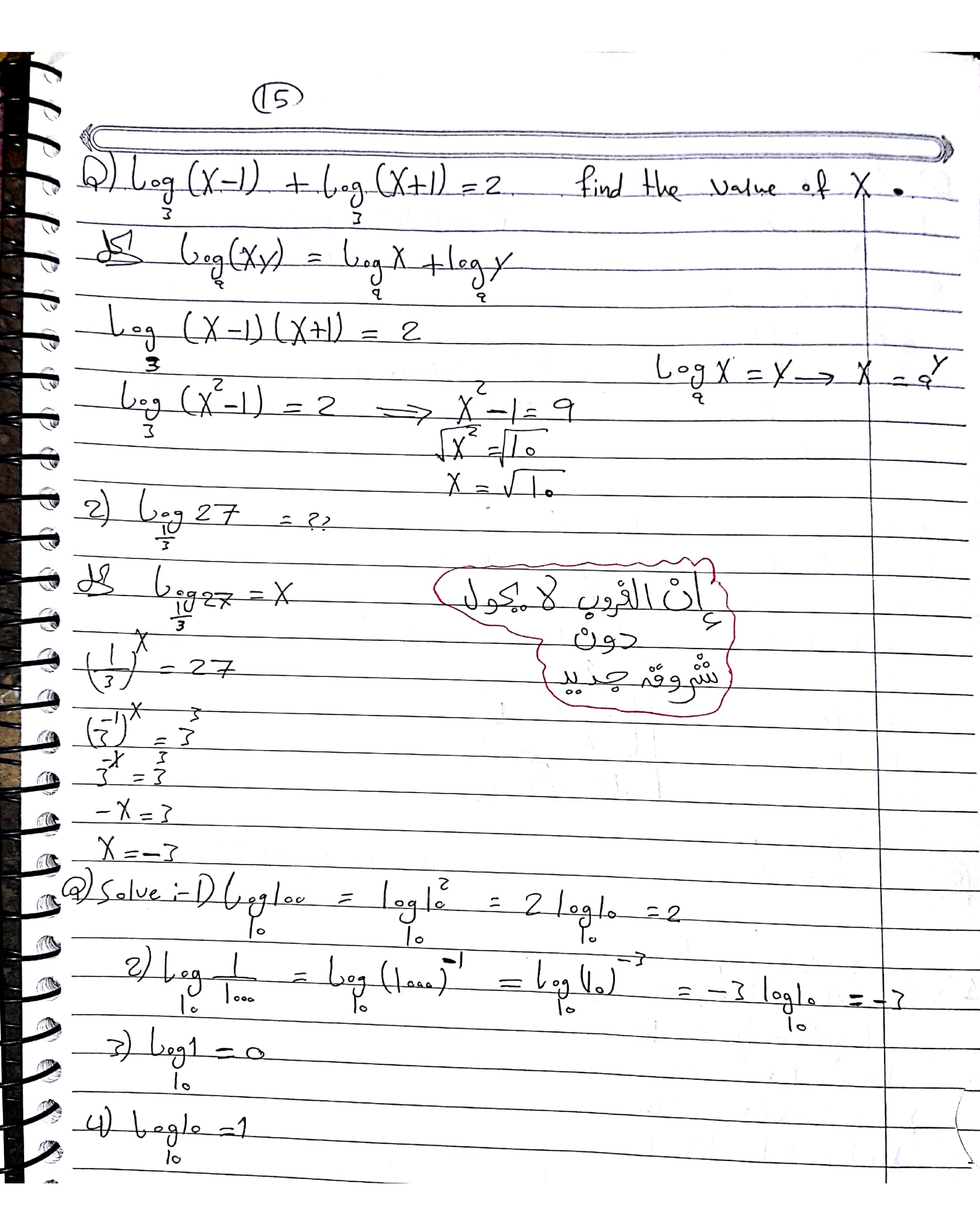
5) $\ln 1 = 0$

6) $\ln e = 1$

7) $e^{\ln} = 1$

8) $\ln e^X = X \ln e = X$

9) $e^{\ln X} = X$



Q) $\log_3 (X-1) + \log_3 (X+1) = 2$ find the value of X.

حل $\log_a (XY) = \log_a X + \log_a Y$

$\log_3 (X-1)(X+1) = 2$

$\log_3 (X^2-1) = 2 \Rightarrow X^2 - 1 = 9$

$\sqrt{X^2} = \sqrt{10}$

$X = \sqrt{10}$

$\log_a X = Y \rightarrow X = a^Y$

2) $\log_{\frac{1}{3}} 27 = ??$

حل $\log_{\frac{1}{3}} 27 = X$

$\left(\frac{1}{3}\right)^X = 27$

$(3^{-1})^X = 3^3$

$3^{-X} = 3^3$

$-X = 3$

$X = -3$

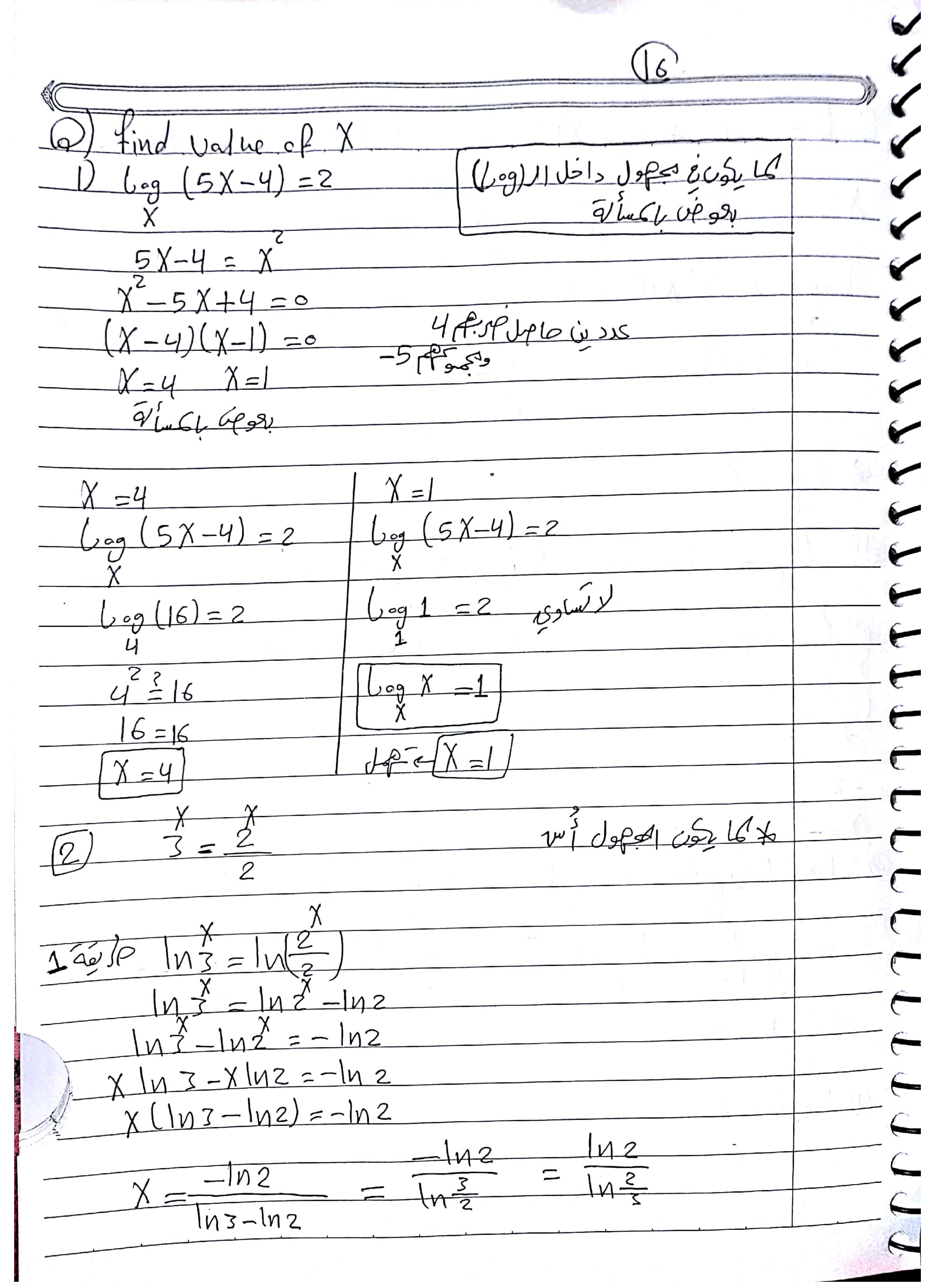
ان الغروب لا يكون
دون
شروقة جديد

Q) Solve:- 1) $\log_{10} 100 = \log_{10} 10^2 = 2 \log_{10} 10 = 2$

2) $\log_{10} \frac{1}{1000} = \log_{10} (1000)^{-1} = \log_{10} (10)^{-3} = -3 \log_{10} 10 = -3$

3) $\log_{10} 1 = 0$

4) $\log_{10} 10 = 1$



Q) find value of X

1) $\log_{X}(5X-4)=2$

لما يكون في مجهول داخل ال (Log) بعوض بالمسألة

$5X-4=X^2$

$X^2-5X+4=0$

$(X-4)(X-1)=0$ — عددين حاصل ضربهم 4 ومجموعهم −5

$X=4 \quad X=1$

بعوض بالمسألة

$X=4$	$X=1$
$\log_{X}(5X-4)=2$	$\log_{X}(5X-4)=2$
$\log_{4}(16)=2$	$\log_{1}1=2$ لا تساوي
$4^2 \overset{?}{=} 16$	$\boxed{\log_{X}X=1}$
$16=16$	$\boxed{X=1}$ ← مرفوض
$\boxed{X=4}$	

(2) $3^X=\frac{2^X}{2}$ — لما يكون المجهول أُس

طريقة 1: $\ln 3^X=\ln\left(\frac{2^X}{2}\right)$

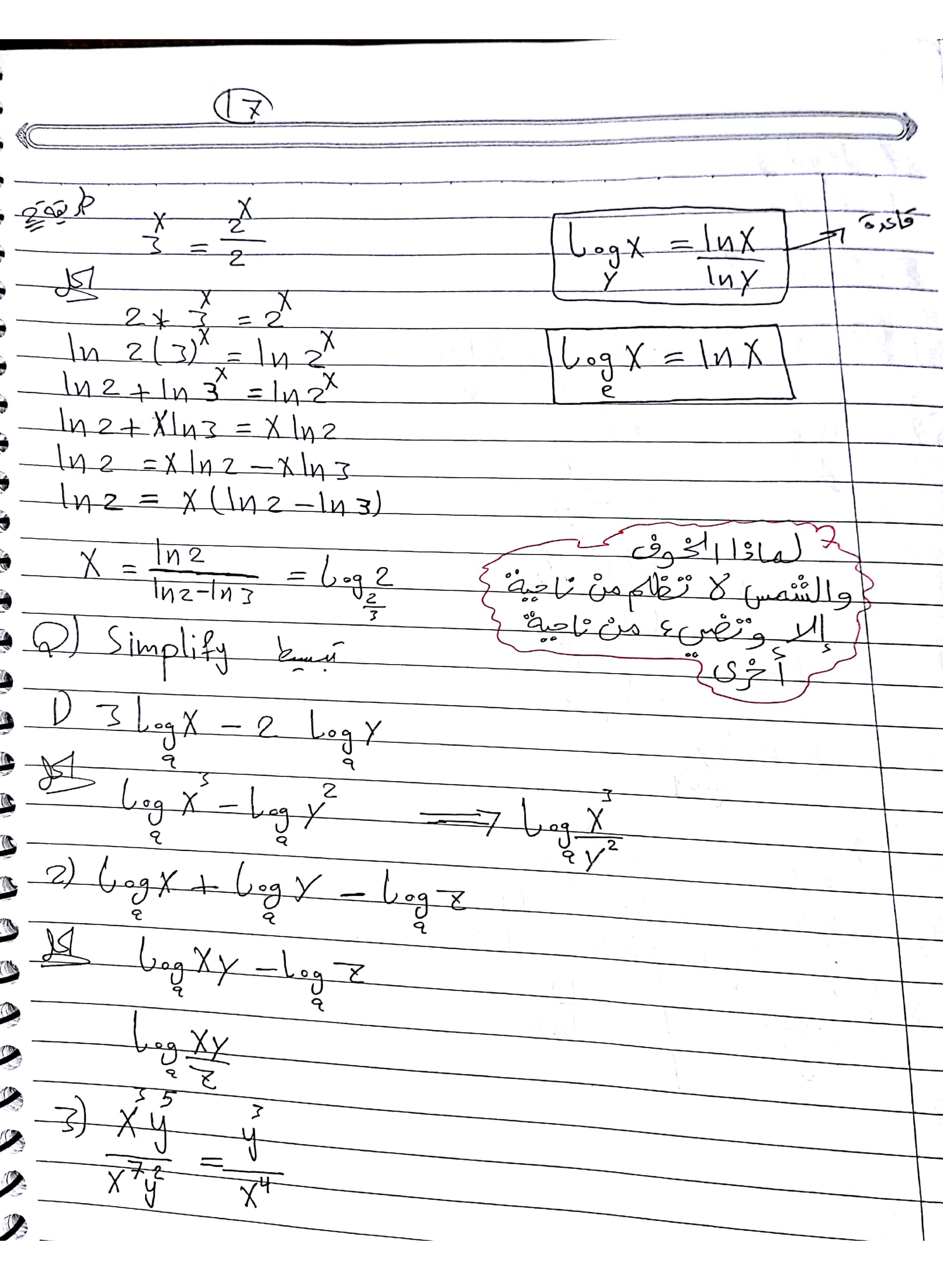
$\ln 3^X=\ln 2^X-\ln 2$

$\ln 3^X-\ln 2^X=-\ln 2$

$X\ln 3-X\ln 2=-\ln 2$

$X(\ln 3-\ln 2)=-\ln 2$

$X=\frac{-\ln 2}{\ln 3-\ln 2}=\frac{-\ln 2}{\ln\frac{3}{2}}=\frac{\ln 2}{\ln\frac{2}{3}}$



كويز

$3^x = \frac{2^x}{2}$

قاعدة ← $\log_y x = \frac{\ln x}{\ln y}$

$\log_e x = \ln x$

الحل

$2 * 3^x = 2^x$

$\ln 2(3)^x = \ln 2^x$

$\ln 2 + \ln 3^x = \ln 2^x$

$\ln 2 + x\ln 3 = x\ln 2$

$\ln 2 = x\ln 2 - x\ln 3$

$\ln 2 = x(\ln 2 - \ln 3)$

$x = \frac{\ln 2}{\ln 2 - \ln 3} = \log_{\frac{2}{3}} 2$

لماذا الخوف والشمس لا تظلم من ناحية إلا وتضيء من ناحية أخرى

Q) Simplify تبسيط

1) $3\log_a x - 2\log_a y$

الحل $\log_a x^3 - \log_a y^2 \Longrightarrow \log_a \frac{x^3}{y^2}$

2) $\log_a x + \log_a y - \log_a z$

الحل $\log_a xy - \log_a z$

$\log_a \frac{xy}{z}$

3) $\frac{x^3 y^5}{x^7 y^2} = \frac{y^3}{x^4}$

Rules

1) $e^{x} \times e^{y} = e^{x+y}$

2) $\frac{e^{x}}{e^{y}} = e^{x-y}$

3) $e^{\ln x} = x$ 4) $\ln e^{x} = x \ln e = x$

Q) Solve الحل $2(7)^{-x} = 3^{x}$

الحل

$2 = \frac{3^{x}}{7^{-x}}$

$2 = (3^{x})(7^{x})$

$2 = (21)^{x}$

$\log 2 = \log 21^{x}$

$\log 2 = x \log 21$

$x = \frac{\log 2}{\log 21}$

2) $2^{x} = 5$

الحل

$\log 2^{x} = \log 5$

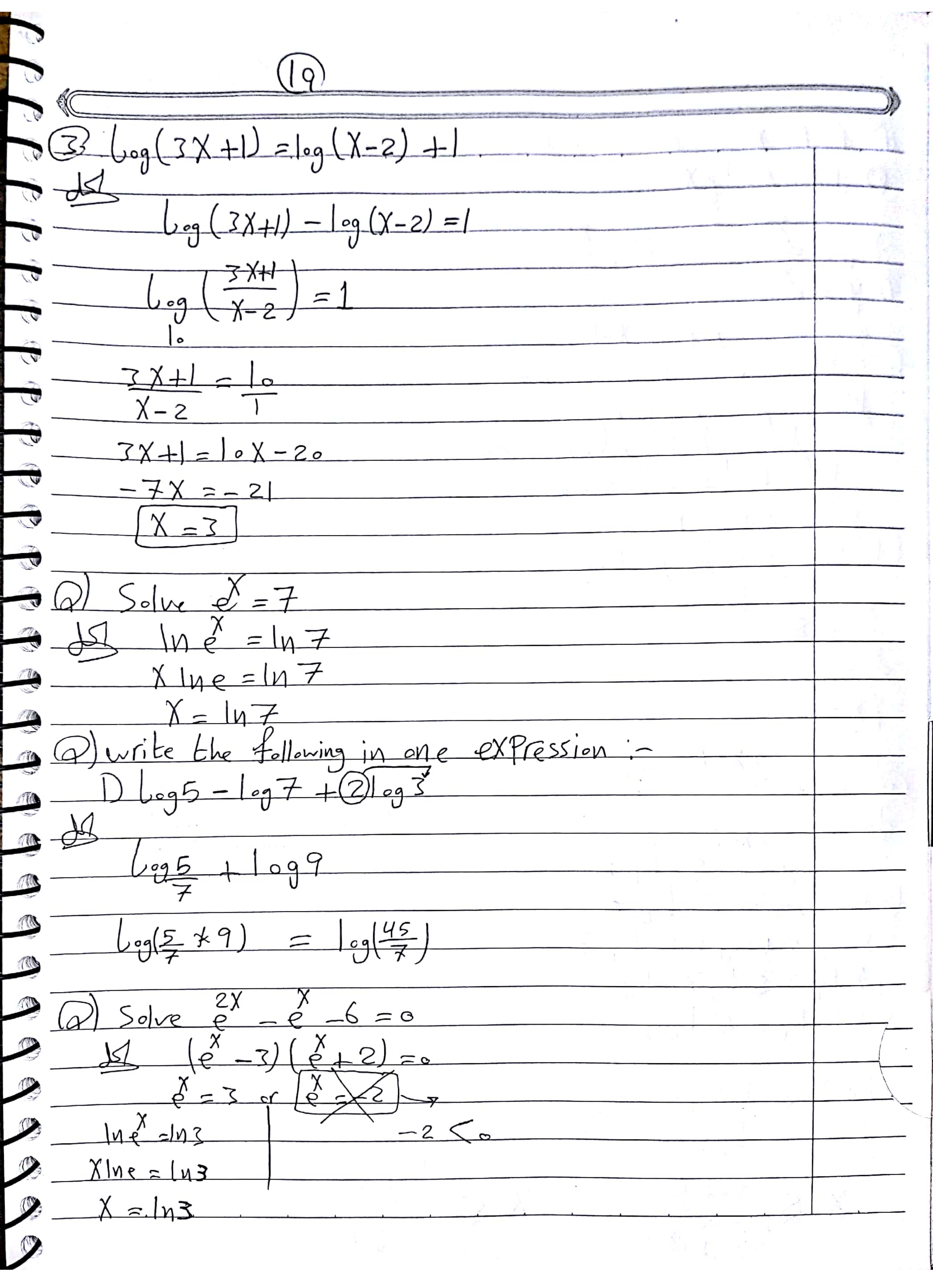
$x = \frac{\log 5}{\log 2}$

$2^{x} = 5$

$\ln 2^{x} = \ln 5$

$x \ln 2 = \ln 5$

$x = \frac{\ln 5}{\ln 2}$



③ $\log(3x+1) = \log(x-2) + 1$

حل

$$\log(3x+1) - \log(x-2) = 1$$

$$\log_{10}\left(\frac{3x+1}{x-2}\right) = 1$$

$$\frac{3x+1}{x-2} = \frac{10}{1}$$

$$3x+1 = 10x - 20$$

$$-7x = -21$$

$$\boxed{x = 3}$$

Q) Solve $e^x = 7$

حل $\ln e^x = \ln 7$

$$x \ln e = \ln 7$$

$$x = \ln 7$$

Q) write the following in one expression :-

1) $\log 5 - \log 7 + ②\log 3$

حل

$$\log \frac{5}{7} + \log 9$$

$$\log\left(\frac{5}{7} * 9\right) = \log\left(\frac{45}{7}\right)$$

Q) Solve $e^{2x} - e^x - 6 = 0$

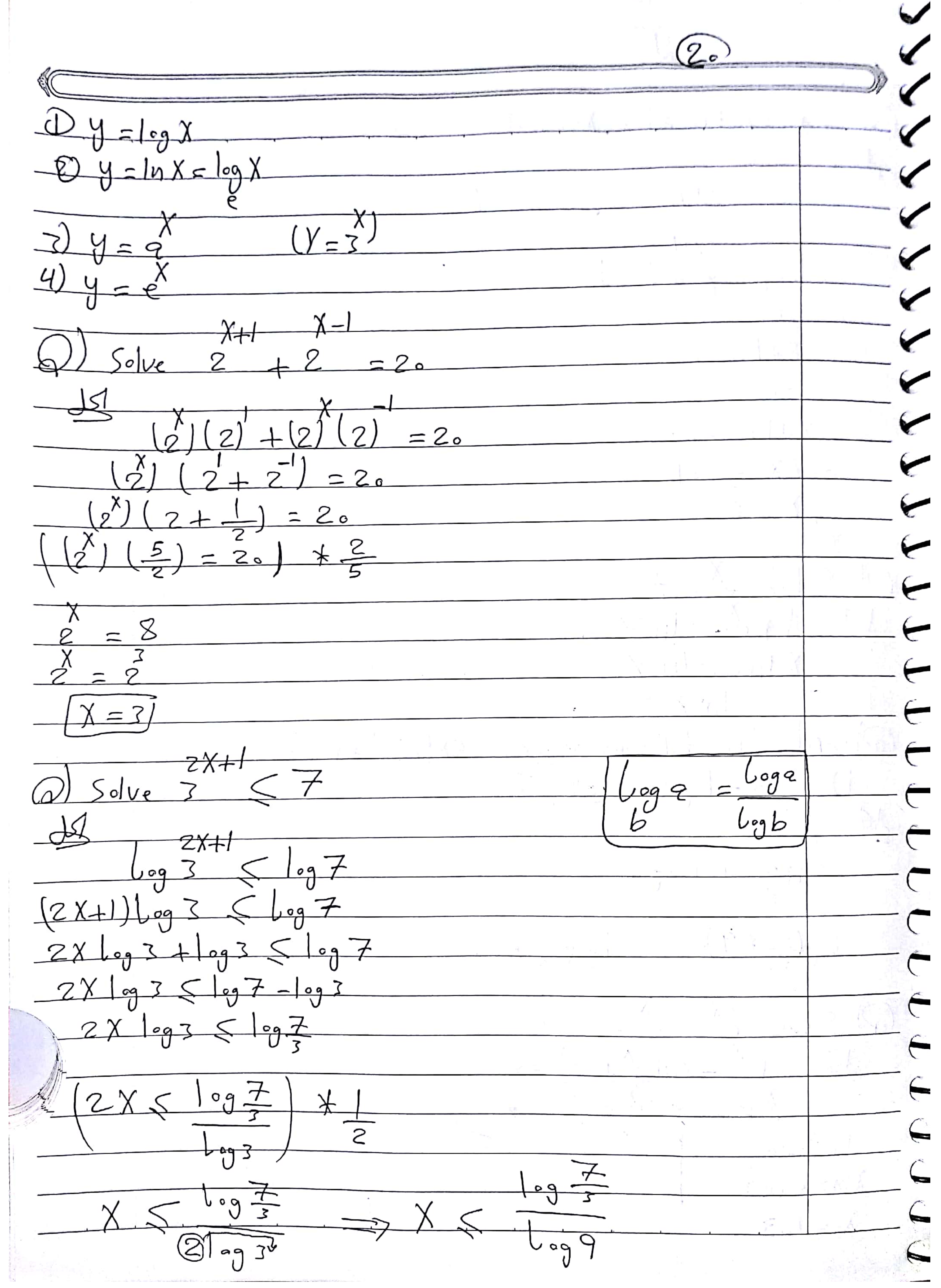
حل $(e^x - 3)(e^x + 2) = 0$

$e^x = 3$ or $\boxed{e^x = -2}$ (crossed out) $\rightarrow -2 < 0$

$$\ln e^x = \ln 3$$

$$x \ln e = \ln 3$$

$$x = \ln 3$$



① $y = \log x$

② $y = \ln x = \log_e x$

3) $y = 9^x$ $\quad (y = 3^x)$

4) $y = e^x$

Q) Solve $2^{x+1} + 2^{x-1} = 20$

الحل

$(2^x)(2)^1 + (2)^x(2)^{-1} = 20$

$(2^x)(2^1 + 2^{-1}) = 20$

$(2^x)(2 + \frac{1}{2}) = 20$

$\left((2^x)(\frac{5}{2}) = 20\right) * \frac{2}{5}$

$2^x = 8$

$2^x = 2^3$

$\boxed{x = 3}$

Q) Solve $3^{2x+1} \le 7$

$\boxed{\log_b a = \frac{\log a}{\log b}}$

الحل

$\log 3^{2x+1} \le \log 7$

$(2x+1)\log 3 \le \log 7$

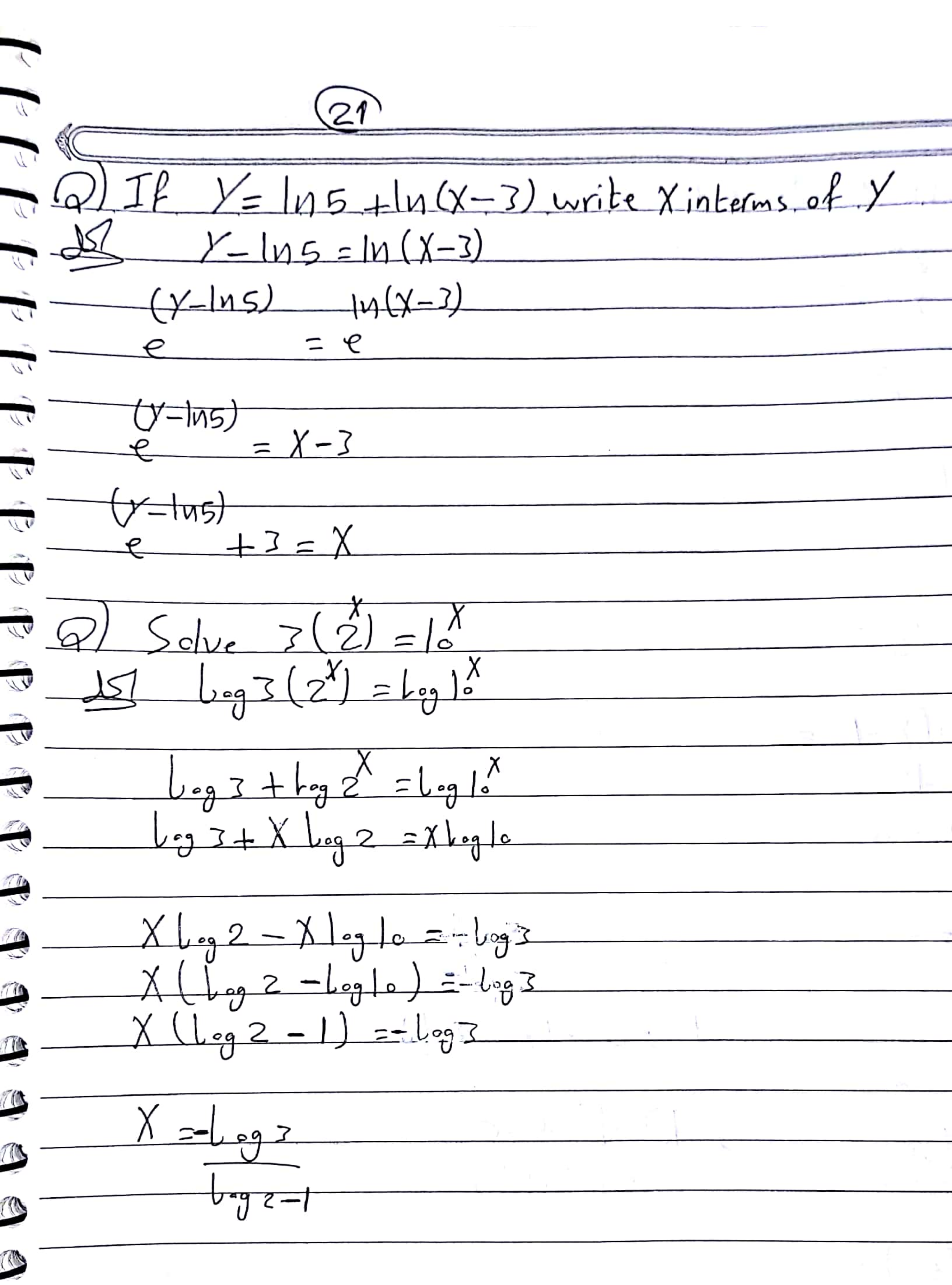
$2x\log 3 + \log 3 \le \log 7$

$2x\log 3 \le \log 7 - \log 3$

$2x\log 3 \le \log \frac{7}{3}$

$\left(2x \le \frac{\log \frac{7}{3}}{\log 3}\right) * \frac{1}{2}$

$x \le \frac{\log \frac{7}{3}}{(2)\log 3^{2}} \Rightarrow x \le \frac{\log \frac{7}{3}}{\log 9}$



Q) If $Y = \ln 5 + \ln(X-3)$ write X interms of Y

Sol

$$Y - \ln 5 = \ln(X-3)$$

$$e^{(Y-\ln 5)} = e^{\ln(X-3)}$$

$$e^{(Y-\ln 5)} = X-3$$

$$e^{(Y-\ln 5)} + 3 = X$$

Q) Solve $3(2^x) = 10^x$

Sol

$$\log 3(2^x) = \log 10^x$$

$$\log 3 + \log 2^x = \log 10^x$$

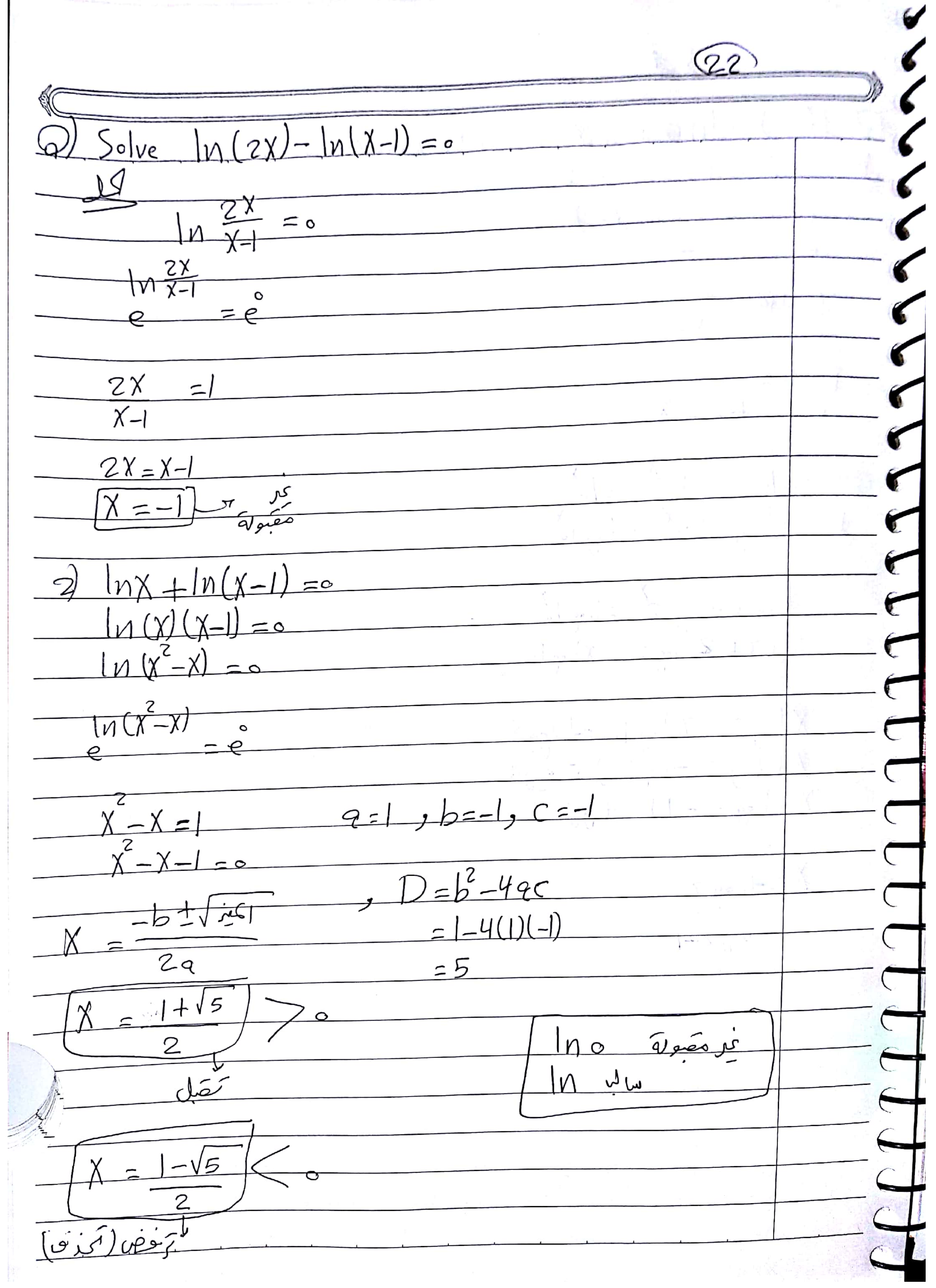
$$\log 3 + X \log 2 = X \log 10$$

$$X \log 2 - X \log 10 = -\log 3$$

$$X(\log 2 - \log 10) = -\log 3$$

$$X(\log 2 - 1) = -\log 3$$

$$X = \frac{-\log 3}{\log 2 - 1}$$



Q) Solve $\ln(2x) - \ln(x-1) = 0$

الحل

$$\ln \frac{2x}{x-1} = 0$$

$$e^{\ln \frac{2x}{x-1}} = e^{0}$$

$$\frac{2x}{x-1} = 1$$

$$2x = x-1$$

$$x = -1$$ → غير مقبولة

2) $\ln x + \ln(x-1) = 0$

$$\ln(x)(x-1) = 0$$

$$\ln(x^2 - x) = 0$$

$$e^{\ln(x^2-x)} = e^{0}$$

$$x^2 - x = 1$$ $a=1,\ b=-1,\ c=-1$

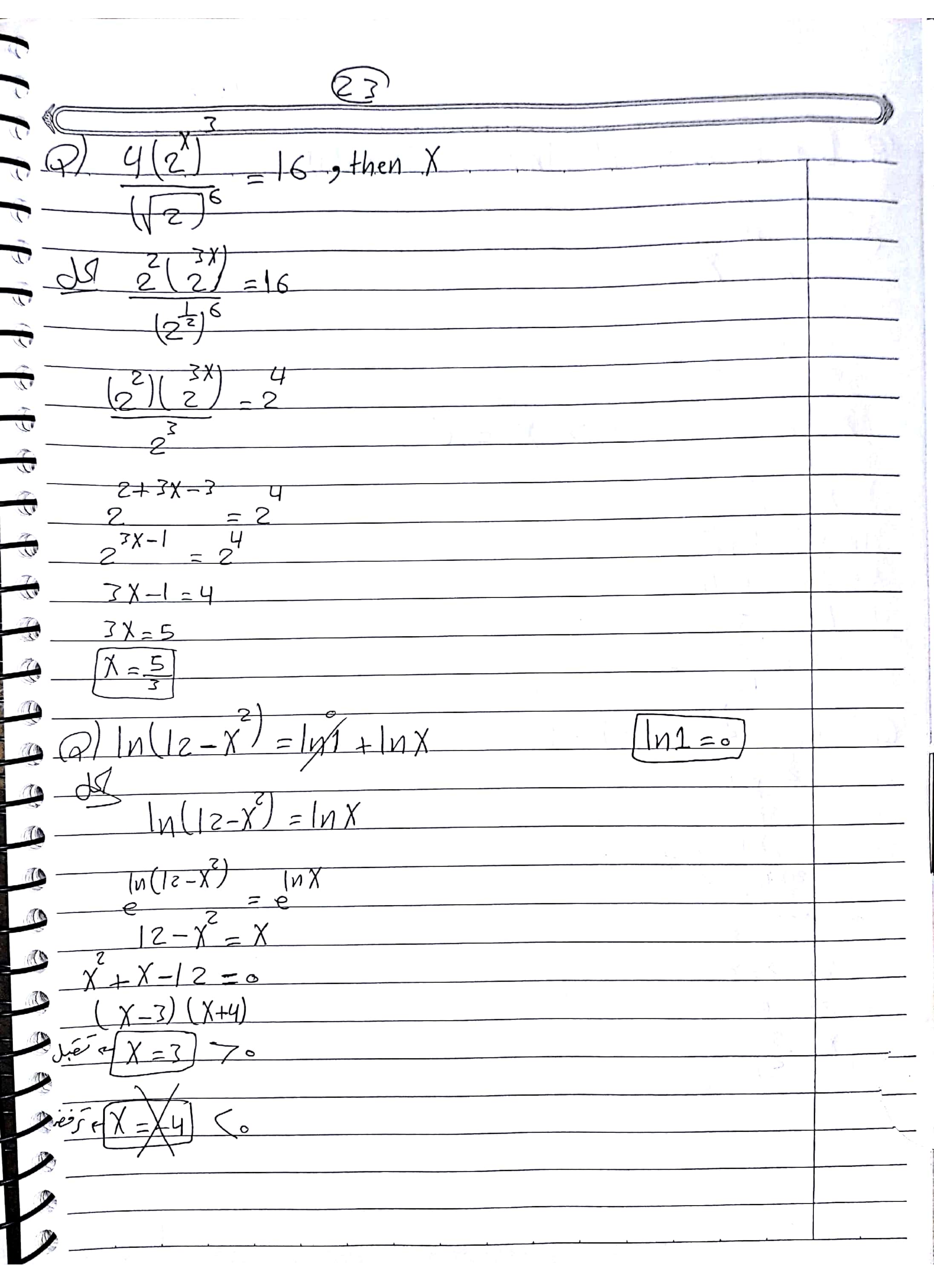
$$x^2 - x - 1 = 0$$

$$x = \frac{-b \pm \sqrt{\text{المميز}}}{2a}$$, $D = b^2 - 4ac = 1 - 4(1)(-1) = 5$

$$x = \frac{1+\sqrt{5}}{2} > 0$$ → تقبل

$$x = \frac{1-\sqrt{5}}{2} < 0$$ → ترفض (تحذف)

$\ln 0$ غير مقبولة
$\ln$ سالب



Q) $\frac{4(2^{x})^{3}}{(\sqrt{2})^{6}} = 16$, then x

الحل

$$\frac{2^{2}(2^{3x})}{(2^{\frac{1}{2}})^{6}} = 16$$

$$\frac{(2^{2})(2^{3x})}{2^{3}} = 2^{4}$$

$$2^{2+3x-3} = 2^{4}$$

$$2^{3x-1} = 2^{4}$$

$$3x-1 = 4$$

$$3x = 5$$

$$\boxed{x = \frac{5}{3}}$$

Q) $\ln(12 - x^{2}) = \ln 1 + \ln x$ $\quad \boxed{\ln 1 = 0}$

الحل

$$\ln(12 - x^{2}) = \ln x$$

$$e^{\ln(12 - x^{2})} = e^{\ln x}$$

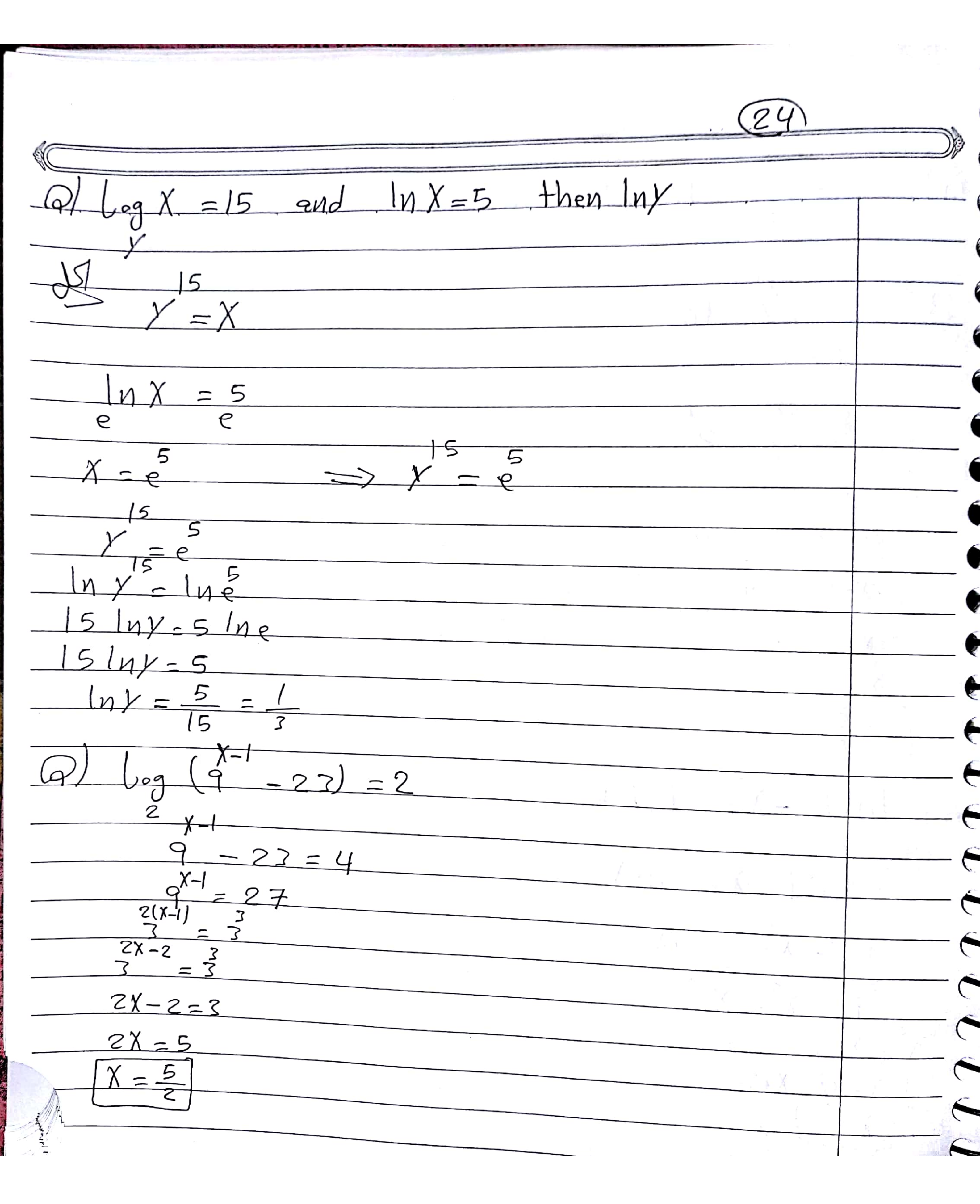
$$12 - x^{2} = x$$

$$x^{2} + x - 12 = 0$$

$$(x-3)(x+4)$$

تقبل ← $\boxed{x = 3} > 0$

ترفض ← $\boxed{x = -4} < 0$ (crossed out)



Q/ $\log_y X = 15$ and $\ln X = 5$ then $\ln y$

Sol

$y^{15} = X$

$e^{\ln X} = e^5$

$X = e^5 \Rightarrow y^{15} = e^5$

$y^{15} = e^5$

$\ln y^{15} = \ln e^5$

$15 \ln y = 5 \ln e$

$15 \ln y = 5$

$\ln y = \frac{5}{15} = \frac{1}{3}$

Q) $\log_2 (9^{X-1} - 23) = 2$

$9^{X-1} - 23 = 4$

$9^{X-1} = 27$

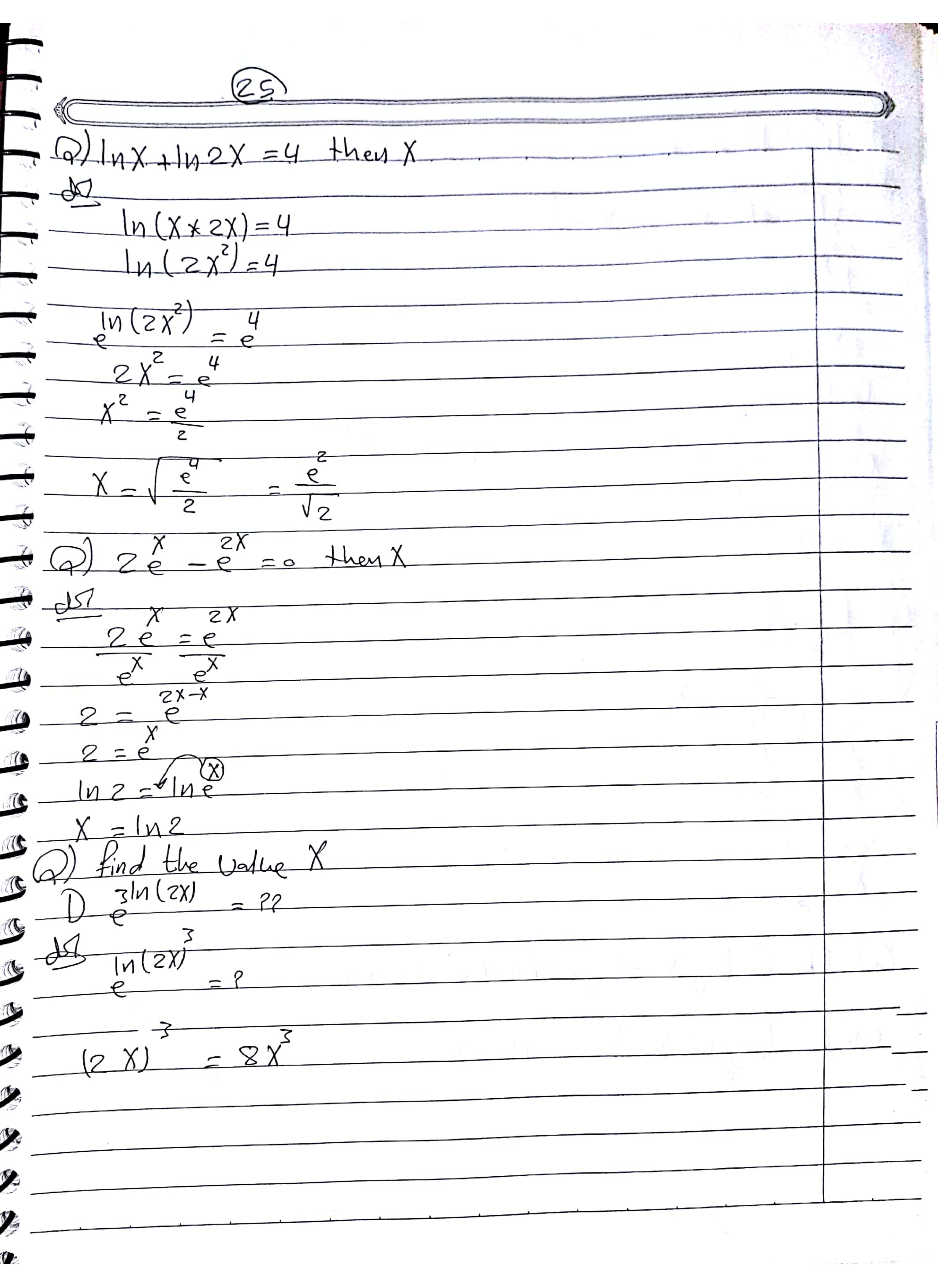
$3^{2(X-1)} = 3^3$

$3^{2X-2} = 3^3$

$2X - 2 = 3$

$2X = 5$

$\boxed{X = \frac{5}{2}}$



Q) $\ln X + \ln 2X = 4$ then X

حل

$$\ln(X \times 2X) = 4$$

$$\ln(2X^2) = 4$$

$$e^{\ln(2X^2)} = e^4$$

$$2X^2 = e^4$$

$$X^2 = \frac{e^4}{2}$$

$$X = \sqrt{\frac{e^4}{2}} = \frac{e^2}{\sqrt{2}}$$

Q) $2e^X - e^{2X} = 0$ then X

حل

$$\frac{2e^X}{e^X} = \frac{e^{2X}}{e^X}$$

$$2 = e^{2X - X}$$

$$2 = e^X$$

$$\ln 2 = \ln e^{(X)}$$

$$X = \ln 2$$

Q) find the value X

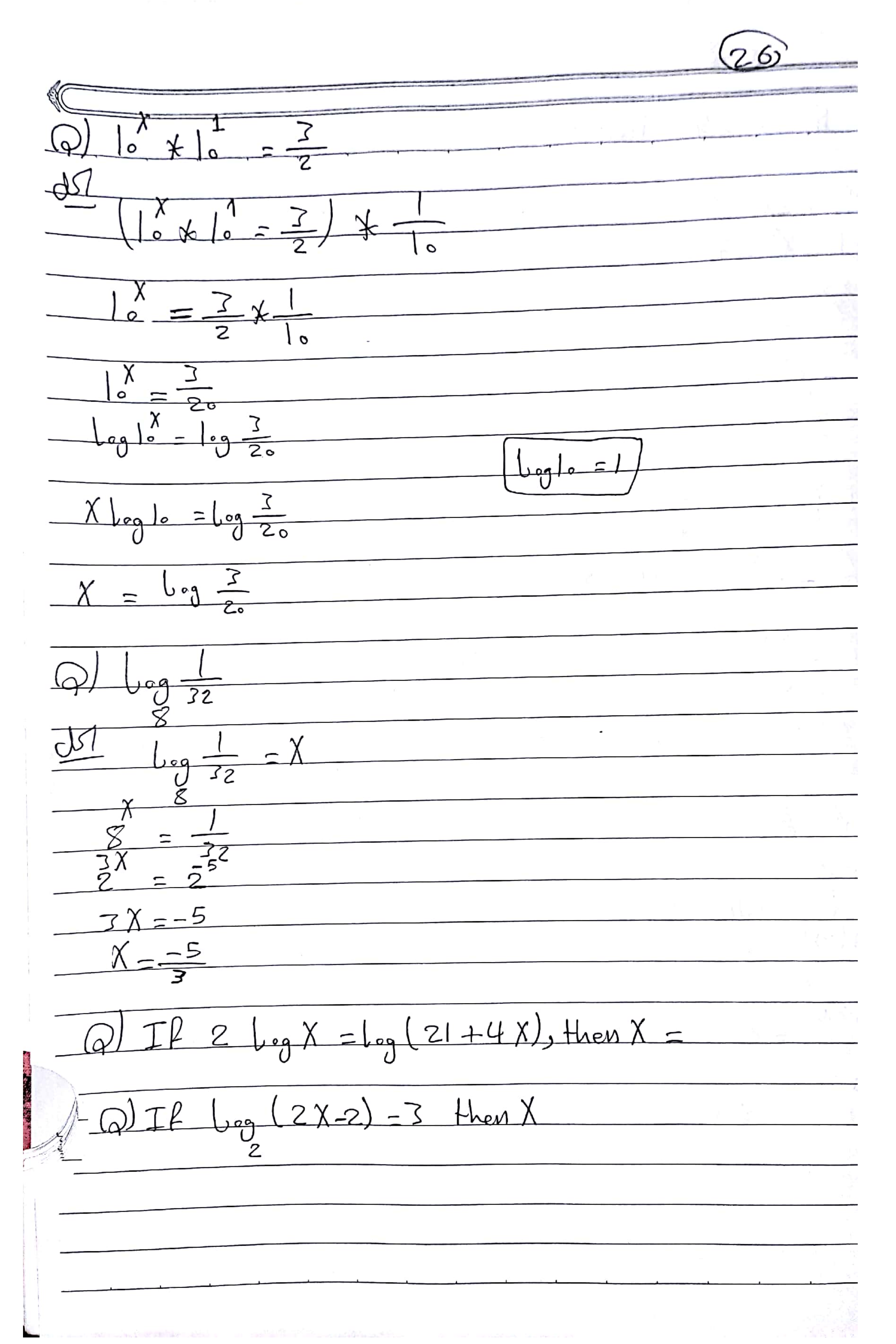
D) $e^{3\ln(2X)} = ??$

حل

$$e^{\ln(2X)^3} = ?$$

$$(2X)^3 = 8X^3$$

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Q) $10^x * 10^1 = \frac{3}{2}$

حل

$(10^x * 10^1 = \frac{3}{2}) * \frac{1}{10}$

$10^x = \frac{3}{2} * \frac{1}{10}$

$10^x = \frac{3}{20}$

$\log 10^x = \log \frac{3}{20}$

$\boxed{\log 10 = 1}$

$x \log 10 = \log \frac{3}{20}$

$x = \log \frac{3}{20}$

Q) $\log_8 \frac{1}{32}$

حل $\log_8 \frac{1}{32} = x$

$8^x = \frac{1}{32}$

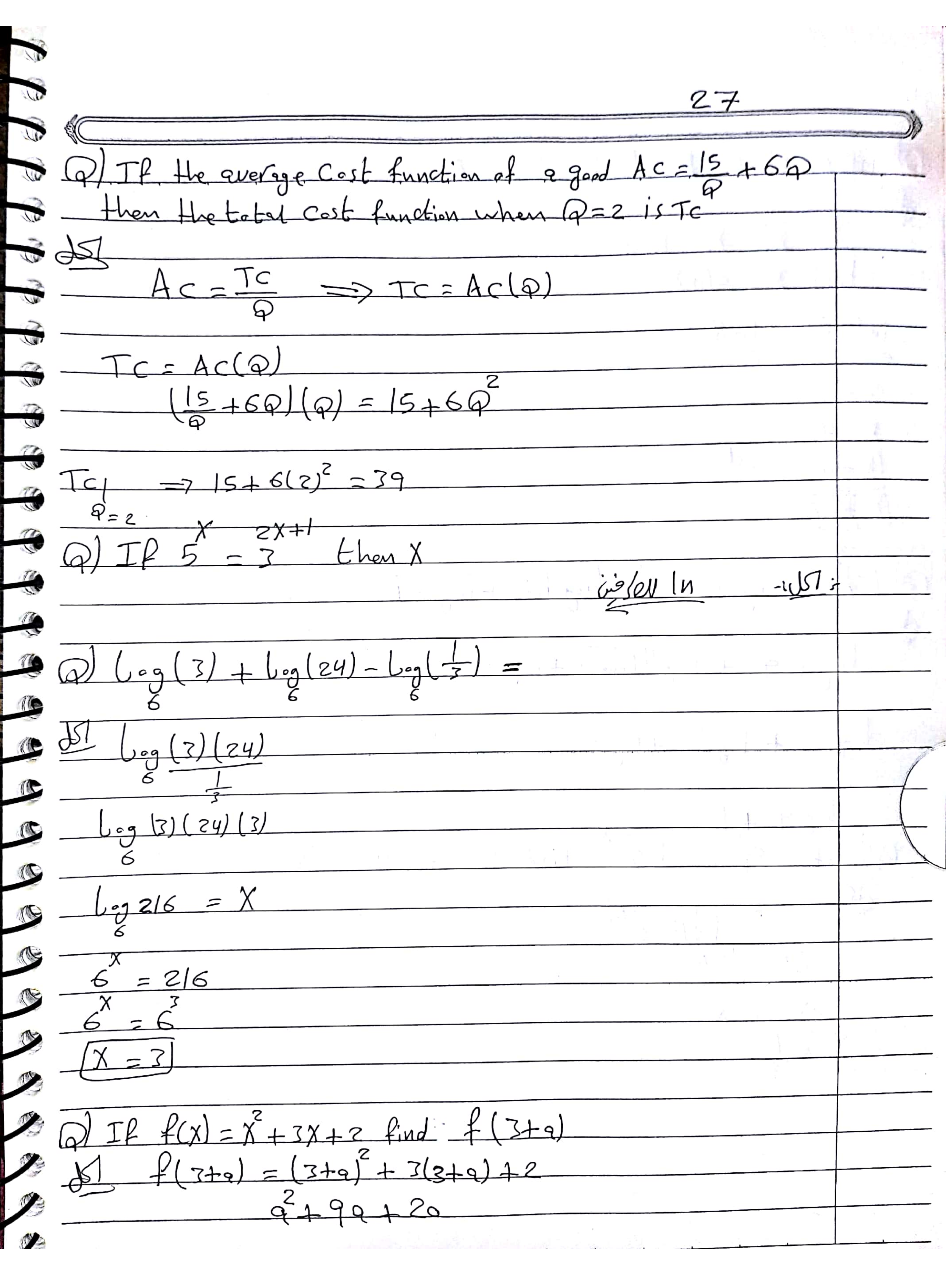
$2^{3x} = 2^{-5}$

$3x = -5$

$x = \frac{-5}{3}$

Q) If $2 \log x = \log(21 + 4x)$, then $x =$

Q) If $\log_2 (2x-2) = 3$ then x



Q) If the average cost function of a good $AC = \frac{15}{Q} + 6Q$ then the total cost function when $Q=2$ is TC

الحل

$$AC = \frac{TC}{Q} \Rightarrow TC = AC(Q)$$

$$TC = AC(Q)$$

$$\left(\frac{15}{Q} + 6Q\right)(Q) = 15 + 6Q^2$$

$$TC\big|_{Q=2} \Rightarrow 15 + 6(2)^2 = 39$$

Q) If $5^{X} = 3^{2X+1}$ then X

الحل: ln للطرفين

Q) $\log_6(3) + \log_6(24) - \log_6\left(\frac{1}{3}\right) =$

الحل $\log_6 \frac{(3)(24)}{\frac{1}{3}}$

$\log_6 (3)(24)(3)$

$\log_6 216 = X$

$6^X = 216$

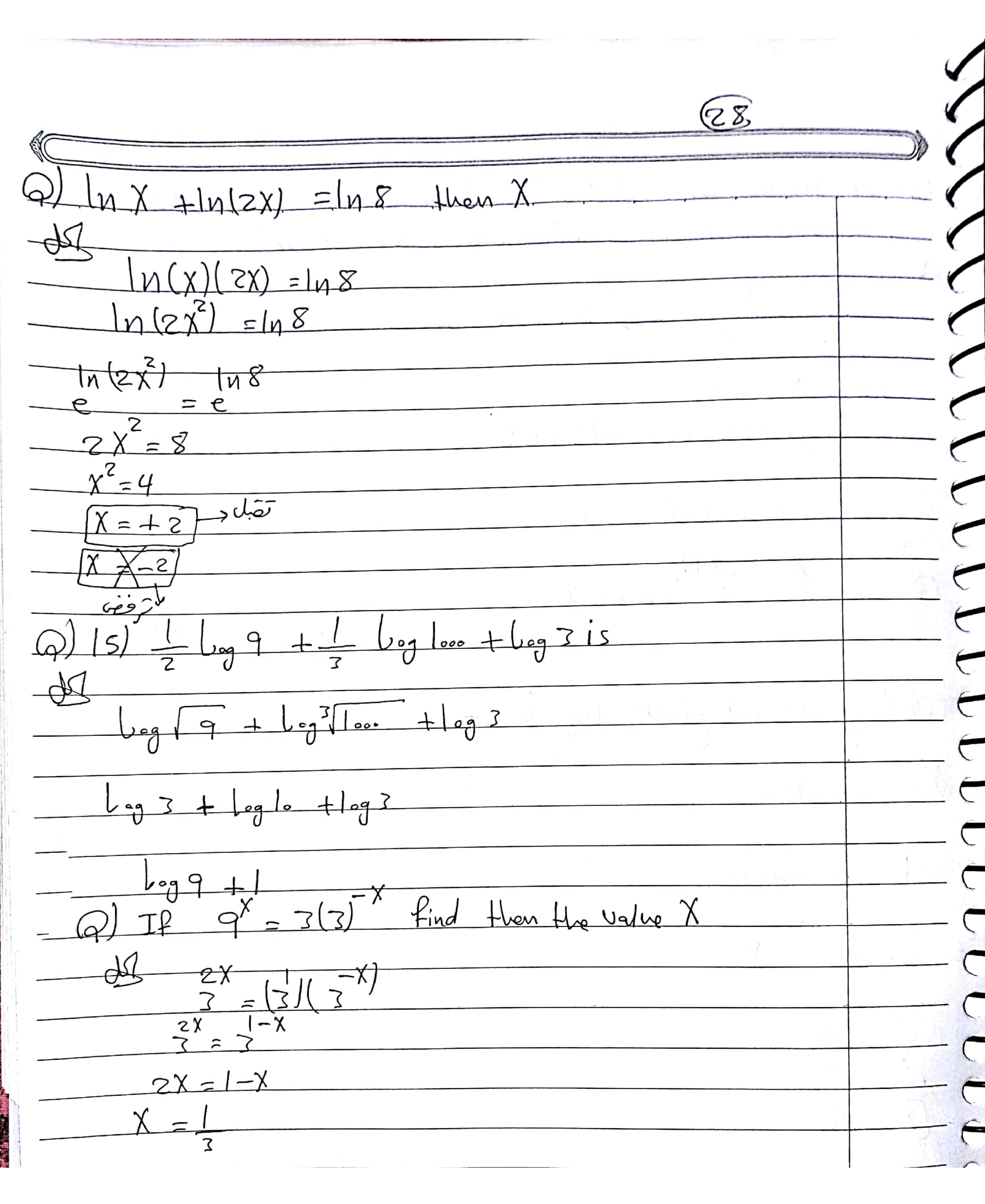
$6^X = 6^3$

$\boxed{X = 3}$

Q) If $f(x) = x^2 + 3x + 2$ find $f(3+a)$

الحل $f(3+a) = (3+a)^2 + 3(3+a) + 2$

$a^2 + 9a + 20$



Q) $\ln X + \ln(2X) = \ln 8$ then X

الحل

$\ln(x)(2x) = \ln 8$

$\ln(2x^2) = \ln 8$

$e^{\ln(2x^2)} = e^{\ln 8}$

$2x^2 = 8$

$x^2 = 4$

$X = +2$ → تقبل

~~$X = -2$~~ → ترفض

Q) 15) $\frac{1}{2}\log 9 + \frac{1}{3}\log 1000 + \log 3$ is

الحل

$\log\sqrt{9} + \log\sqrt[3]{1000} + \log 3$

$\log 3 + \log 10 + \log 3$

$\log 9 + 1$

Q) If $9^x = 3(3)^{-x}$ find then the value X

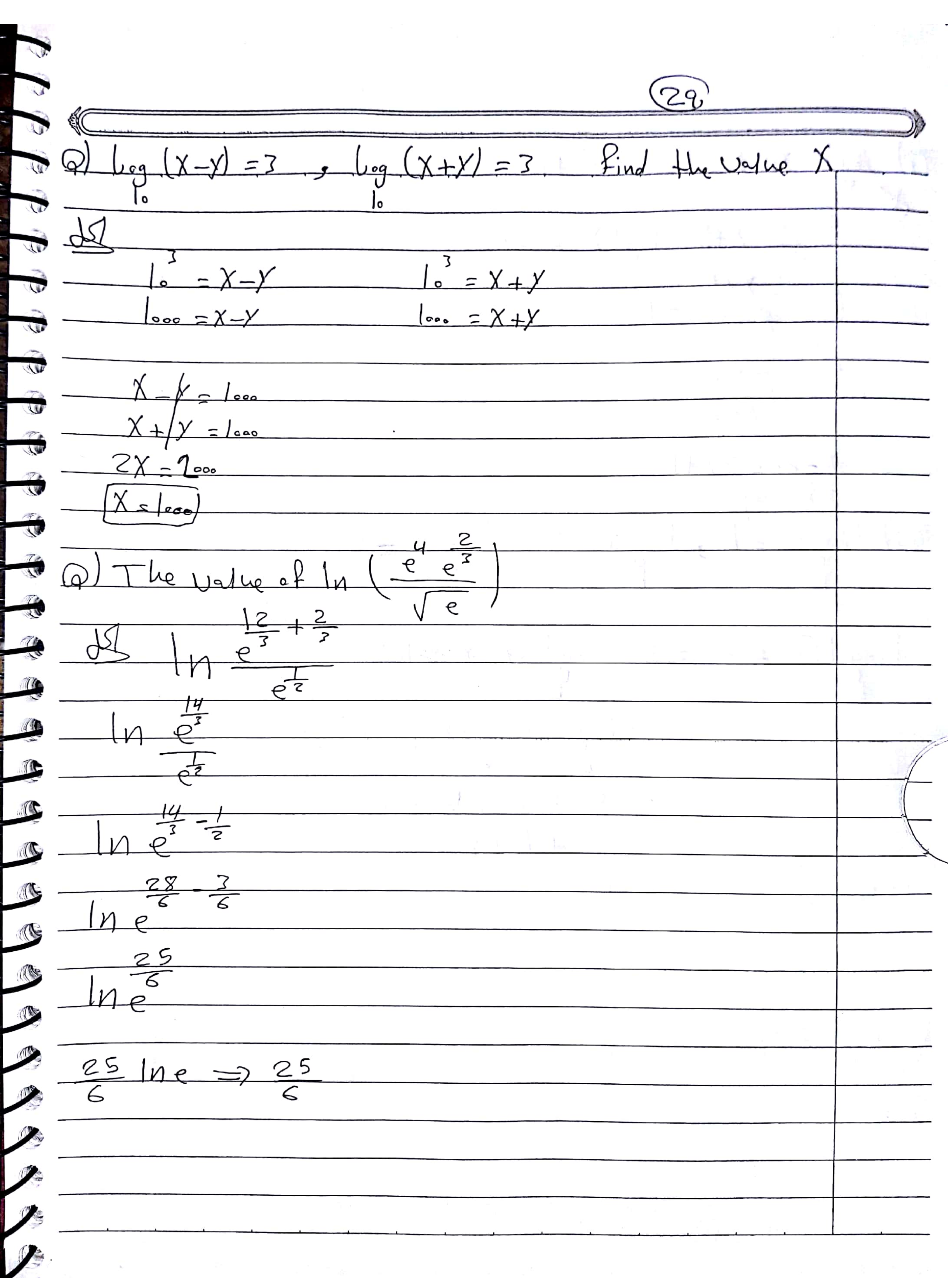
الحل

$3^{2x} = (3^1)(3^{-x})$

$3^{2x} = 3^{1-x}$

$2x = 1 - x$

$x = \frac{1}{3}$



Q) $\log_{10}(X-Y)=3$, $\log_{10}(X+Y)=3$ find the value X

sol

$10^3 = X-Y$ $\qquad$ $10^3 = X+Y$

$1000 = X-Y$ $\qquad$ $1000 = X+Y$

$X - Y = 1000$
$X + Y = 1000$
$2X = 2000$
$\boxed{X = 1000}$

Q) The value of $\ln\left(\frac{e^4 e^{\frac{2}{3}}}{\sqrt{e}}\right)$

sol $\ln \frac{e^{\frac{12}{3}+\frac{2}{3}}}{e^{\frac{1}{2}}}$

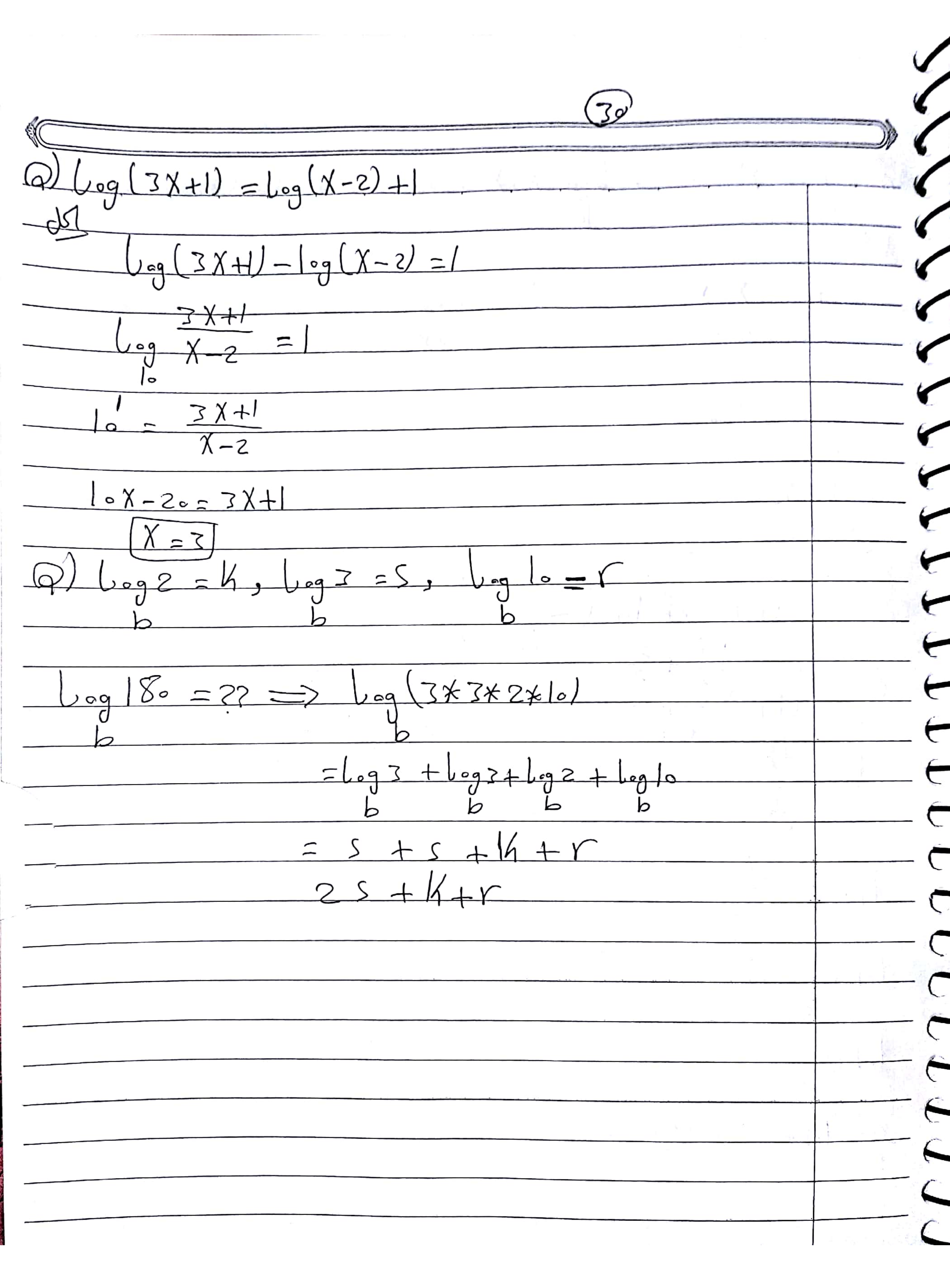
$\ln \frac{e^{\frac{14}{3}}}{e^{\frac{1}{2}}}$

$\ln e^{\frac{14}{3}-\frac{1}{2}}$

$\ln e^{\frac{28}{6}-\frac{3}{6}}$

$\ln e^{\frac{25}{6}}$

$\frac{25}{6}\ln e \Rightarrow \frac{25}{6}$



Q) $\log(3X+1) = \log(X-2) + 1$

حل

$$\log(3X+1) - \log(X-2) = 1$$

$$\log_{10} \frac{3X+1}{X-2} = 1$$

$$10^1 = \frac{3X+1}{X-2}$$

$$10X - 20 = 3X + 1$$

$$\boxed{X = 3}$$

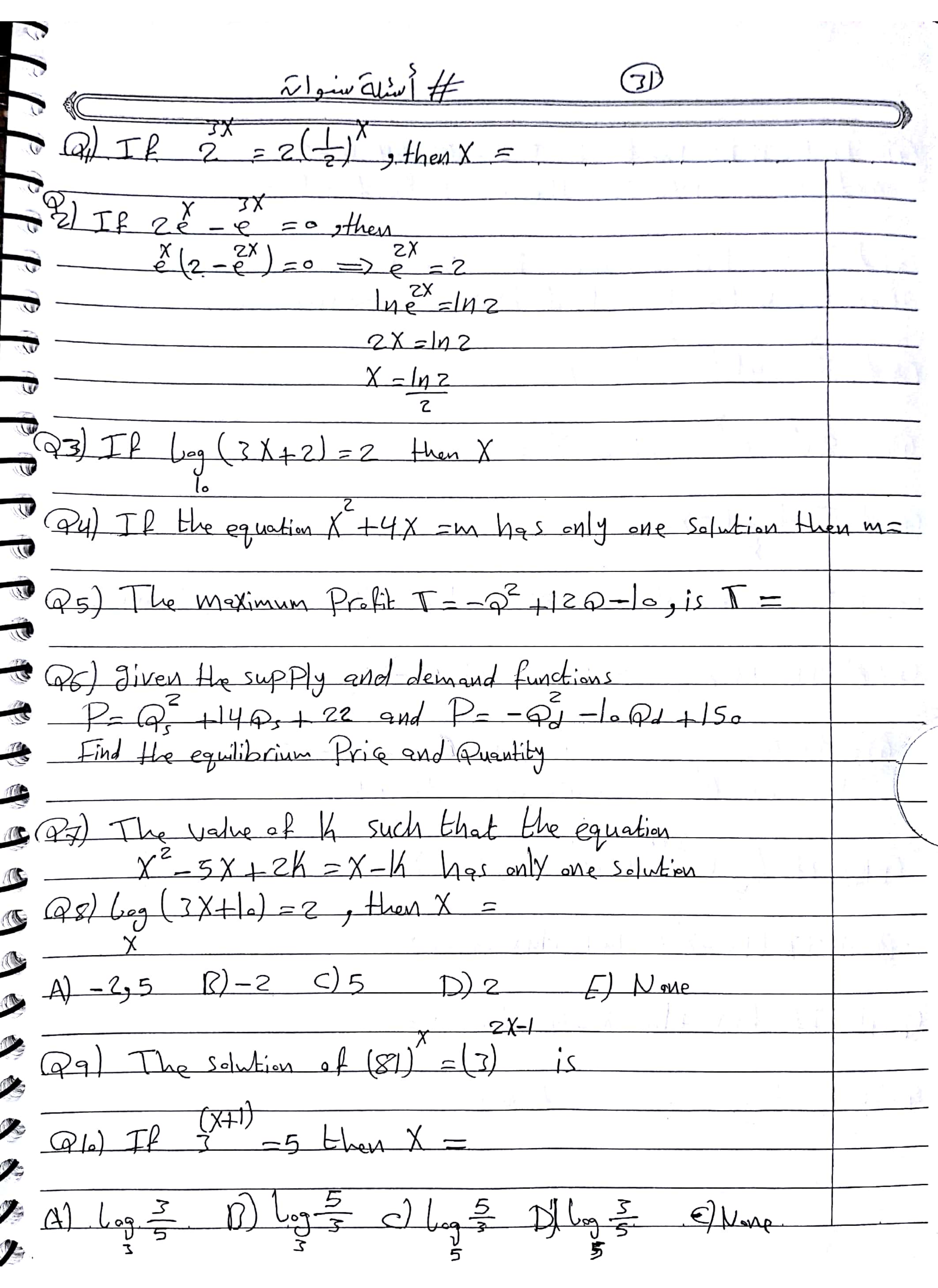
Q) $\log_b 2 = k$, $\log_b 3 = s$, $\log_b 10 = r$

$$\log_b 180 = ?? \implies \log_b(3 * 3 * 2 * 10)$$

$$= \log_b 3 + \log_b 3 + \log_b 2 + \log_b 10$$

$$= s + s + k + r$$

$$2s + k + r$$



أسئلة سنوات # (31)

Q1) If $2^{3X} = 2\left(\frac{1}{2}\right)^{X}$, then $X =$

Q2) If $2e^{X} - e^{3X} = 0$, then

$e^{X}(2 - e^{2X}) = 0 \Rightarrow e^{2X} = 2$

$\ln e^{2X} = \ln 2$

$2X = \ln 2$

$X = \frac{\ln 2}{2}$

Q3) If $\log_{10}(3X+2) = 2$ then X

Q4) If the equation $X^2 + 4X = m$ has only one solution then $m =$

Q5) The maximum Profit $\pi = -Q^2 + 12Q - 10$, is $\pi =$

Q6) given the supply and demand functions

$P = Q_s^2 + 14Q_s + 22$ and $P = -Q_d^2 - 10Q_d + 150$

Find the equilibrium Price and Quantity

Q7) The value of k such that the equation

$X^2 - 5X + 2k = X - k$ has only one solution

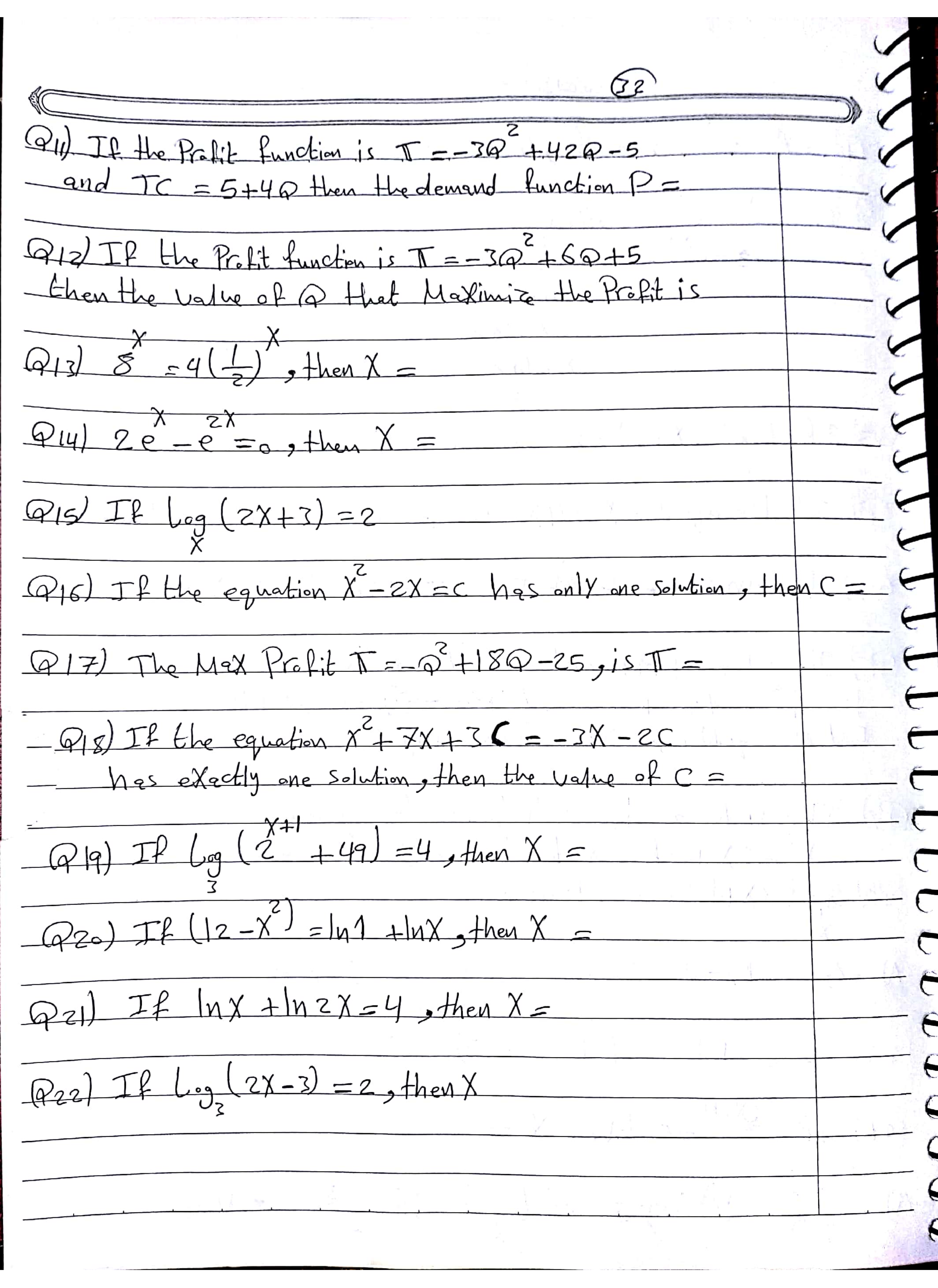
Q8) $\log_X(3X+10) = 2$, then $X =$

A) $-2, 5$ B) -2 C) 5 D) 2 E) None

Q9) The solution of $(81)^X = (3)^{2X-1}$ is

Q10) If $3^{(X+1)} = 5$ then $X =$

A) $\log_3 \frac{3}{5}$ B) $\log_3 \frac{5}{3}$ C) $\log_5 \frac{5}{3}$ D) $\log_5 \frac{3}{5}$ E) None



Q11) If the Profit function is $\pi = -3Q^2 + 42Q - 5$ and $TC = 5 + 4Q$ then the demand function $P =$

Q12) If the Profit function is $\pi = -3Q^2 + 6Q + 5$ then the value of Q that Maximize the Profit is

Q13) $8^x = 4\left(\frac{1}{2}\right)^x$, then $X =$

Q14) $2e^x - e^{2x} = 0$, then $X =$

Q15) If $\log_X (2X+3) = 2$

Q16) If the equation $X^2 - 2X = c$ has only one solution, then $C =$

Q17) The Max Profit $\pi = -Q^2 + 18Q - 25$, is $\pi =$

Q18) If the equation $x^2 + 7X + 3C = -3X - 2C$ has exactly one solution, then the value of $C =$

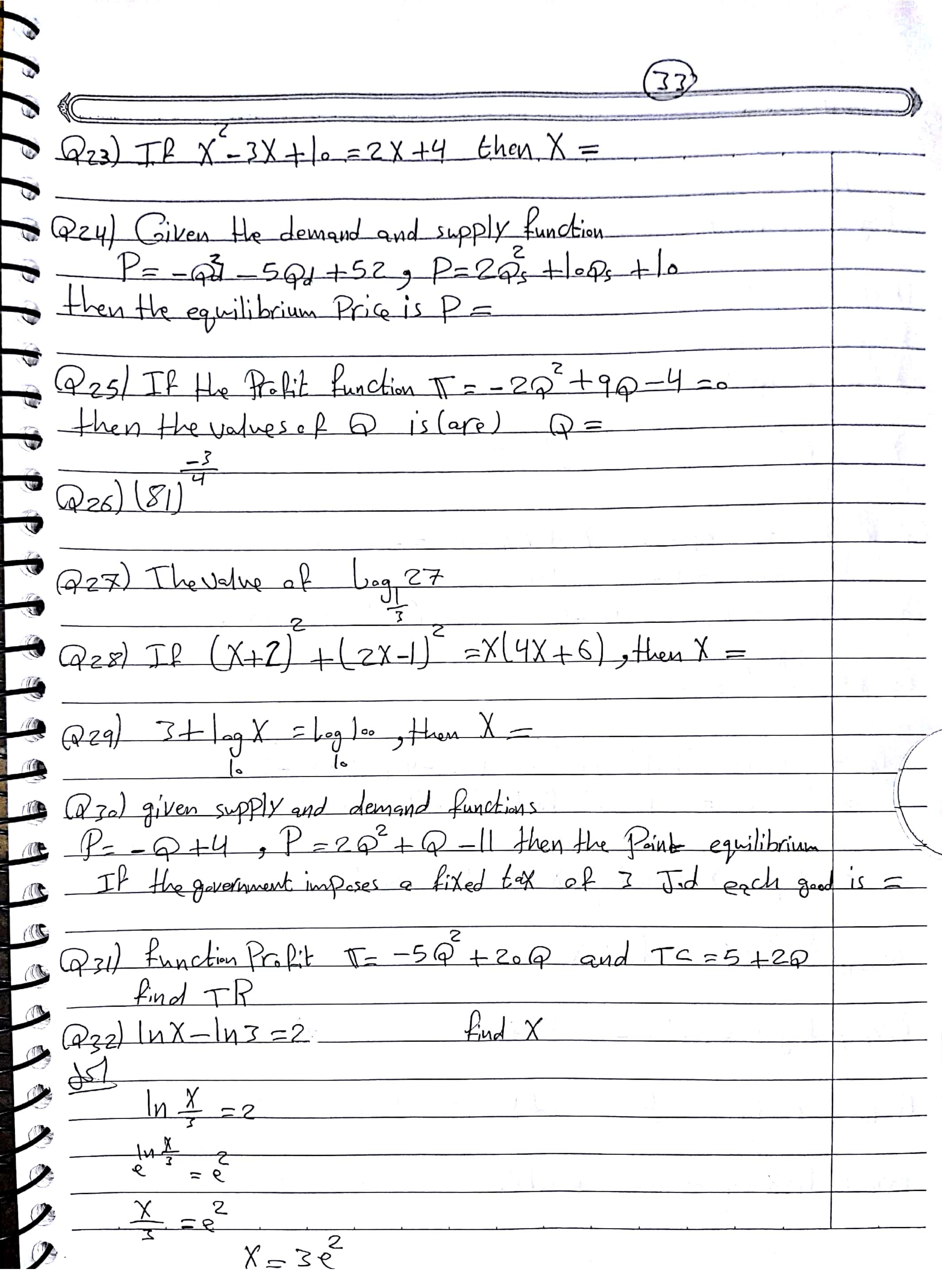
Q19) If $\log_3 (2^{X+1} + 49) = 4$, then $X =$

Q20) If $(12 - X^2) = \ln 1 + \ln X$, then $X =$

Q21) If $\ln X + \ln 2X = 4$, then $X =$

Q22) If $\log_3 (2X-3) = 2$, then X

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Q23) If $X^2 - 3X + 10 = 2X + 4$ then $X =$

Q24) Given the demand and supply function
$P = -Q_d^2 - 5Q_d + 52$, $P = 2Q_s^2 + 10Q_s + 10$
then the equilibrium Price is $P =$

Q25) If the Profit function $\pi = -2Q^2 + 9Q - 4 = 0$
then the values of Q is (are) $Q =$

Q26) $(81)^{\frac{-3}{4}}$

Q27) The value of $\log_{\frac{1}{3}} 27$

Q28) If $(X+2)^2 + (2X-1)^2 = X(4X+6)$, then $X =$

Q29) $3 + \log_{10} X = \log_{10} 100$, then $X =$

Q30) given supply and demand functions
$P = -Q + 4$, $P = 2Q^2 + Q - 11$ then the Point equilibrium
If the government imposes a fixed tax of 3 J.d each good is =

Q31) function Profit $\pi = -5Q^2 + 20Q$ and $TC = 5 + 2Q$
find TR

Q32) $\ln X - \ln 3 = 2$ find X

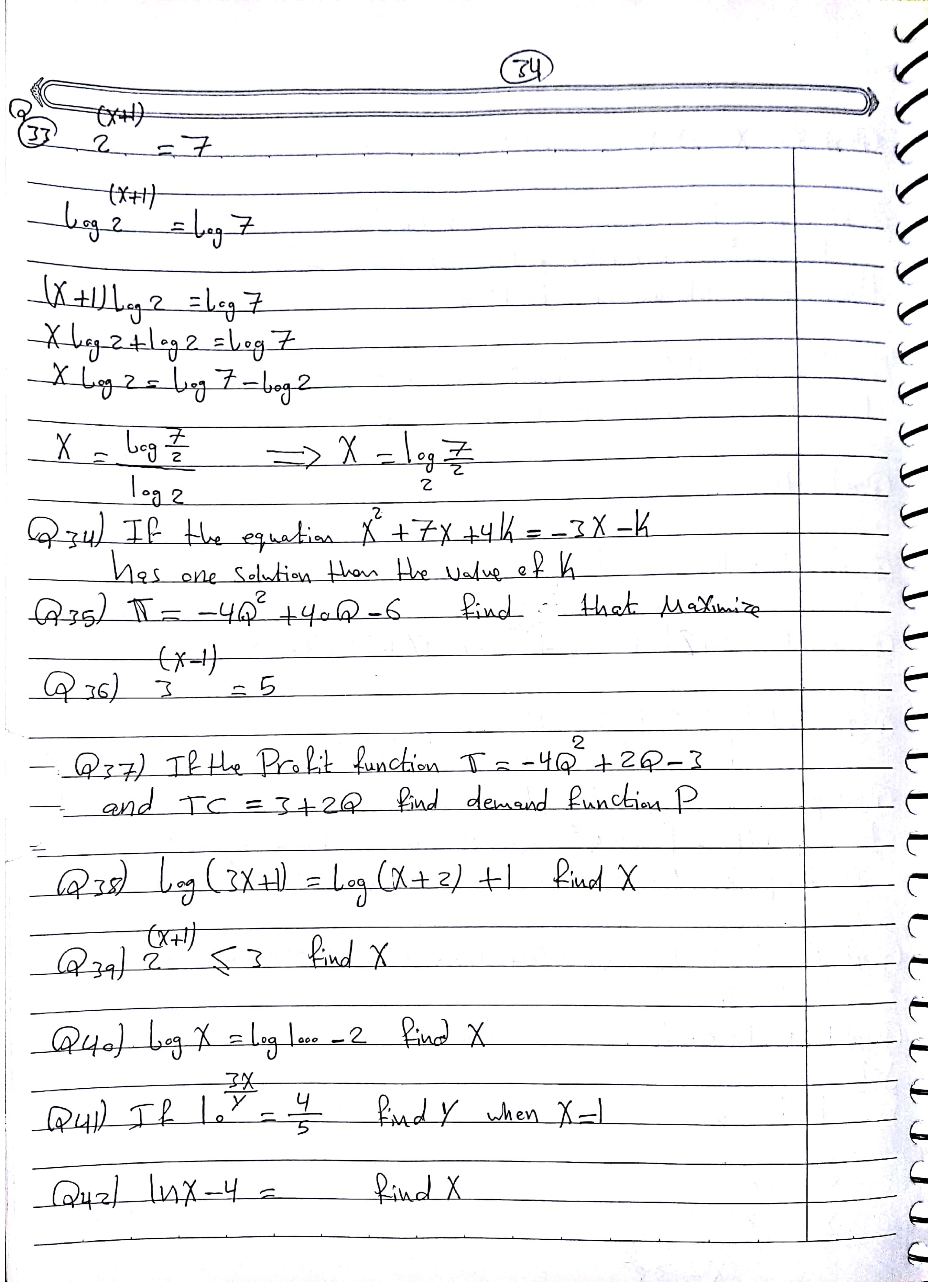
Sol

$\ln \frac{X}{3} = 2$

$e^{\ln \frac{X}{3}} = e^2$

$\frac{X}{3} = e^2$

$X = 3e^2$



Q33) $2^{(X+1)} = 7$

$\log 2^{(X+1)} = \log 7$

$(X+1)\log 2 = \log 7$

$X\log 2 + \log 2 = \log 7$

$X\log 2 = \log 7 - \log 2$

$X = \dfrac{\log \frac{7}{2}}{\log 2} \Longrightarrow X = \log_2 \frac{7}{2}$

Q34) If the equation $X^2 + 7X + 4K = -3X - K$ has one solution then the value of K

Q35) $\Pi = -4Q^2 + 40Q - 6$ find that Maximize

Q36) $3^{(X-1)} = 5$

Q37) If the Profit function $\Pi = -4Q^2 + 2Q - 3$ and $TC = 3 + 2Q$ find demand function P

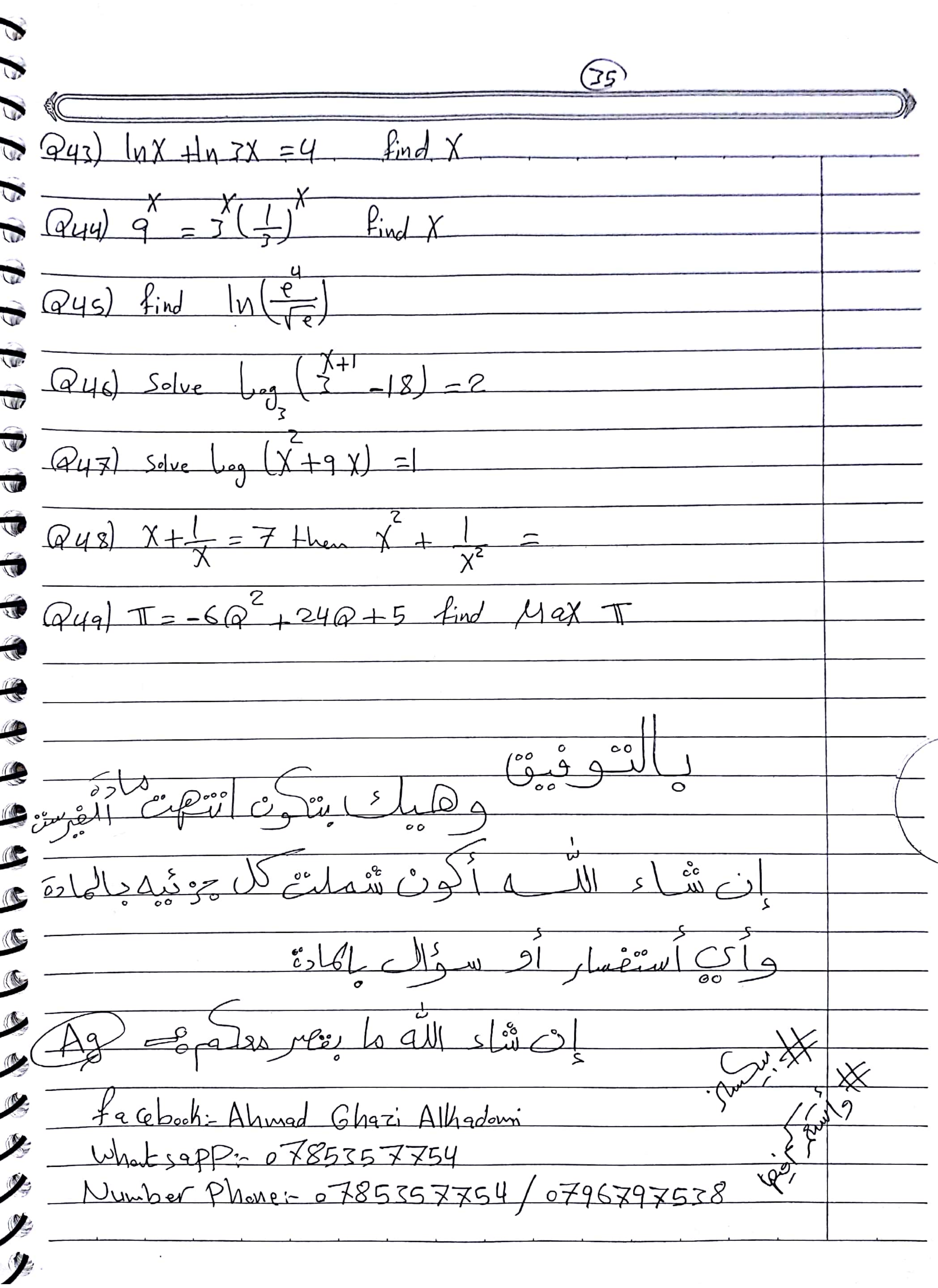
Q38) $\log(3X+1) = \log(X+2) + 1$ find X

Q39) $2^{(X+1)} \leq 3$ find X

Q40) $\log X = \log 1000 - 2$ find X

Q41) If $10^{\frac{3X}{Y}} = \frac{4}{5}$ find Y when $X = 1$

Q42) $\ln X - 4 =$ find X



Q43) $\ln x + \ln 3x = 4$ find x

Q44) $9^x = 3^x \left(\frac{1}{3}\right)^x$ find x

Q45) find $\ln\left(\frac{e^4}{\sqrt{e}}\right)$

Q46) Solve $\log_3\left(3^{x+1} - 18\right) = 2$

Q47) Solve $\log\left(x^2 + 9x\right) = 1$

Q48) $x + \frac{1}{x} = 7$ then $x^2 + \frac{1}{x^2} =$

Q49) $\pi = -6Q^2 + 24Q + 5$ find Max π

بالتوفيق

وهيك بتكون انتهت مادة الفيرست

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